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YOUR SPECTRUM
No.8 October 85p
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SPACE
DROP

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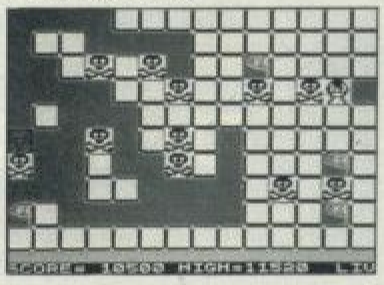
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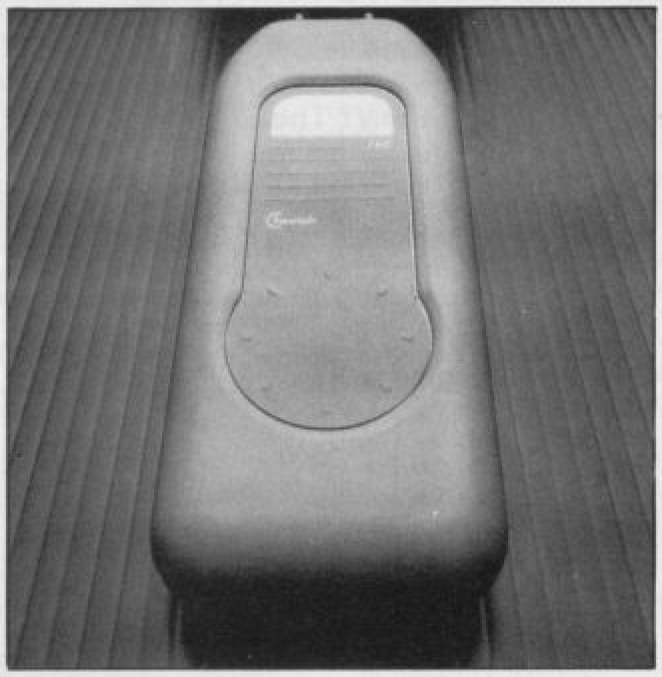
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FRONTLINES

HAMSTERS TO FOLLOW?



Oh for the days when computer peripherals weren't named after vermin! Yes, the RAT is here (Remote Action Transmitter to you!) and it's a new product from Cheetah Marketing. Basically, it's a remote control, touch-sensitive joystick which interfaces — from a distance — with a standard looking peripheral box via infra red transmission.

In use, the case of the box made it pretty difficult to get a secure connection on the Speccy's expansion port, but after fiddling around it *is* possible. In operation, the joystick is sensitive, but there's a marked delay between touching the controls and something happening on-screen.

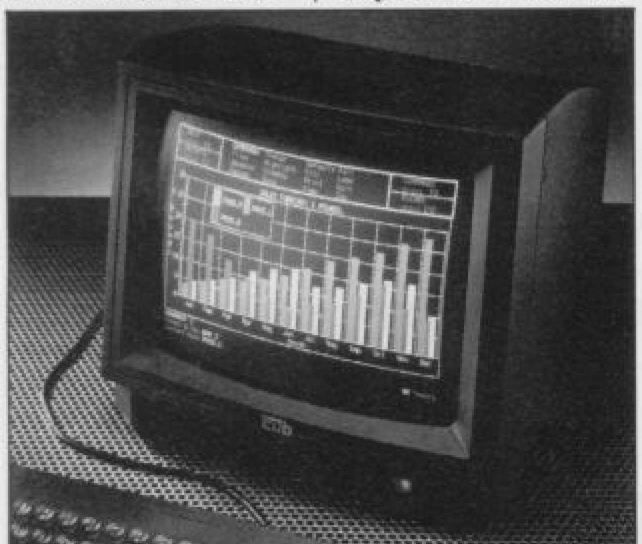
For those who wouldn't touch some games with a barge pole, now you won't have to — you can play from clear across the room. For further details in the £29.95 RAT, call Cheetah Marketing on 01-833 4909.

MONITORING THE QL

Microvitec has just announced a new QL compatible monitor — an eye-catching design at an eye-catching price.

Available with user controls concealed beneath a neat flap on the front of the moulded black QL-matching cabinet, the CUB, code-named 1451/DQ/3, is an RGB/TTL input device with an 18MHz bandwidth and a medium resolution tube which makes it suitable for use with Sinclair graphics. It's got 85-column text capability, and the price is £275.

If you're interested, contact the Sales Department of Microvitec plc, Futures Way, Bolling Road, Bradford BD4 7TU or telephone 0274 390011.



HOLO VICTORY?

The pace of measures to protect software companies against counterfeiting continues unabated. Following the revelations of the Imagine saga, other companies are becoming determined not to fold under the pressure of unscrupulous pirates.

Elite Systems Ltd, a company launched on August 1st, is employing a new protection method against counterfeiting. All its products will carry an inch by half inch hologram of the company's logo on the cassette inlay cards.

These holograms are obtainable from only one source in the world, which means that any Elite product that doesn't display the stickers — once the system gets going — will probably be counterfeit.

The first Elite software with hologram stickers attached should be in the shops by mid-September. Look out for their first offering entitled *Kokotoni Wilf.*

THE RACE FOR SPACE

Following on from the success of *Valhalla,* Legend has recently announced details of its latest package, *The Great Space Race.* Simultaneously launched, for both the Spectrum and Commodore 64, Chairman John Peel reckons the program's development has soaked up well over a quarter of a million pounds — reputed to be the largest amount ever spent on the development of a single computer game.

In many ways, unlike its predecessor, *The Great Race Race* does use a similar (though upgraded) operating system — Movisoft 2 — which is said to feature "technical effects never before seen in home computer software" Talking of the graphics, Peel states, "we have finally achieved true solid 3D graphics which, under the control of a computerised 'camera director', create the most realistic and spectacular pictures ever." There'll also be full facial animation, with detailed close-ups of the various characters taking part.

Legend's first foray into the wilds of space involves players taking part in a two-phase adventure — the first being the pre-race drama, in which characters wheel and deal to amass the fastest spaceships, best personnel and suitable weaponry and the second entering the race itself; this 'anything goes' battle of wits engages you in mortal combat against time and natural obstacles, as well as all the other competitors!

Instead of the traditional 'left', 'right' and 'fire' commands, an option generator is provided which allows other characters in the game to offer you various choices based on the current situation. Says Peel, "the pressure is maintained by giving you only a few seconds to make your choices."

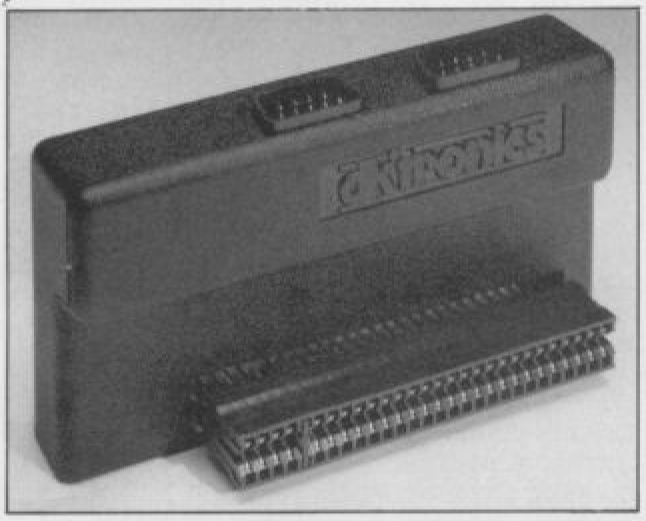
The race is now on . . . either check it out at your nearest micro shop or give Legend a ring on 01-524 8324/5.



FACING UP

Will nothing hold back the prolific Dk'Tronics? Latest for the Spectrum is a Centronics interface at £39.95 (including VAT) that offers fully relocatable software, interfacing with any package that's using the printer channel (*Tasword*, *DEV Pack* and so on); it recognizes LLIST and LPRINT, and it's fully Microdrive compatible.

And from the same company, there's the new Dual Port Joystick Interface — at £13 and featuring first port simulation of '6', '7', '8', '9' and '0' keys. The second port simulates the IN (31) command. The ports will accept any Atari-style joystick. Needless to say these two new products interconnect with the existing vista of Dk'Tronics products.



DISK-LOCATION

The two companies, Thurnall and Datafax, have taken different approaches in pursuit of the Spectrum three-inch disk drive. Datafax offers a suitable interface that hooks on to an Hitachi drive, the two together costing out at £245. The Thurnall unit is £199 and plugs directly into the Speccy.

Before shouting "Geronimo" and leaping on to the cheaper option, it would be wise to consider the differences between the units. The Thurnall device uses commands similar to the LOAD and SAVE equivalents, whereas Datafax uses what are described as 'simple to learn' commands. The Hitachi disks of the Datafax system have a higher memory capacity . . . a full 200K, compared to Thurnall's 150K. But just to confuse the issue, the Thurnall unit fights back by putting its DOS in the interface; Datafax steals 8K of user memory for the same purpose.

Compare them for yourself. Contact Thurnall on 061-775 4461, and Statacom — the Datafax distributor — on 01-337 0311.



HACKING AWAY

Welcome to our regular column for hacker's hints and tips. Poke some fun into your programs and write to
Andrew Pennell, Hacking Away, Your Spectrum, 14 Rathbone Place, London W1P 1DE.

First up this month is one from Denmark, (*YS* certainly seems to get around!) so thanks to **Soren Eilers** for his mods on Oceans's *Eskimo Eddie*. He says he got bored having to do all the intermediary levels of the game, so he's given us a couple of POKEs which let you just get on with the interesting screens. Having listed the header, add POKE 24686,24: POKE 24687,76 before the RANDOMIZE USR statement in line 30 and Bob's your uncle/ auntie!

Staying with Ocean games, we've a couple of hackers who've become mighty interested in *Hunchback*. Fiddling with the header as usual, **Brian Warner** recommends POKE 26888,0 to give you infinite lives (removing the DEC (HL) as always) and POKE 26903,x: POKE 24760,x to set the number of lives, where 'x' has a maximum value of 19.

Alan Brown also described the 'infinite lives' POKE, and asked if anyone out there had corrected the bug that prevents you from getting a bonus if you manage to rescue Esmerelda for a second time *(I can't even rescue her the first time! Ed.)*. He also says that he's got loads of POKEs to disable the nasties — but that it's too easy to play the game without them ... so tough!

One thing Alan was wondering about was how to hack into A&F's *Chuckie Egg* — a tricky one this, mainly because you can't MERGE it and it's headerless to boot. Well, I hacked into it a while ago to make it work with my joystick and it's not too hard. The trick is to LOAD the Basic from machine code, then instead of doing a RET, force an error using RST 8. That should be enough for you to be getting on with for now.

To finish up, let's take a look at the one that started it all off — *Manic Miner*. Although it's getting on a bit now, there's still a few people out there who don't know the 'easy' way of moving about the rooms. On the original Bug-Byte version, you have to type in the sequence of numbers '6031769' (reputed to be Matthew Smith's old phone number) and, while holding down the '6' key press combinations of keys '1' to '5' to move around. When Matthew moved to Software Projects, however, he changed the code to 'TYPEWRITER' — hence the code word for *JSW*. Again, once you've typed the code in, you hold down the '6' key and press combinations of keys '1' to '6'. All this comes from **A Wiseman**, along with the original 'infinite lives' POKE (for the Bug-Byte version *only*) — namely, POKE 35136, 0.

Finally, a blatant demand for information from all of you out there. Please send us anything that looks interesting; from helpful hints to POKEs. Just assemble your disassemblers and get hacking.



POKEING PROCEDURES

Don't panic if all we've given you are the POKEs for a certain game — here's what you have to do to use the little blighters.

First, load the game using the instruction MERGE "", press Enter and start the tape — just as you would when loading normally. When you get the 'OK' message on-screen, stop the tape. Now type LIST and make the necessary alterations as instructed. Once done, type RUN, press Enter and start the tape again from where it left off. That's all there is to it!

RUMBLES



Ever since the days when Tom Brown got roasted at Rugby and Billy Bunter exhausted Greyfriars' tuck shop of its supply of cream buns, the subject of school life and the goings-on behind closed gates have continued to give many an overgrown schoolboy plenty of pleasure. And it's this fascination which has led Channel 8 Software to come up with its latest idea — to turn the activities of one local state secondary school into the storyline for a new computer game.

Called *Quest for Knowledge*, the program features caricatures of all the school's teachers, and a mischievous pupil known as Brainy Brian who proves a magnet for their unwelcome attention. The game begins with a number of empty brains, and the idea is to move around the school, collecting books and tokens in order to accumulate knowledge; thus, the brains are gradually filled. Once a certain level has been achieved, the brain in question will then be ready to gain the relevant 'O' level. Brian, on the other hand, seems content simply to cause the teachers and his fellow pupils the maximum aggravation.

Spokesman John Williams, "*Quest* is based on an actual school — in fact, it's probably got the most active computer department of all the schools in the north of England," which is presumably how C8 came to hear about it. John continues, "We approached them, and were very pleased to be offered the full co-operation of the staff. That was especially good, considering that anyone who attends, or knows the teachers personally, will be able to recognise them immediately."

Unfortunately, John wouldn't be drawn into disclosing the exact identity of the school. Anyone who thinks he or she can identify it will have to wait until the launch (which will be within the next two to three months) to be sure. The program will be priced at £6.95.

Similar in theme to Treasure Island, Mikro-Gen's latest project will take the player off to a sun-kissed desert island in search of buried treasure. Exactly what's buried, Mikro-Gen's Paul Denial isn't saying, and neither will he let on what hazards are hidden there for the unwary. Nevertheless, it all sounds as though it could be something rather special, particularly as the player will only be seeing a sixty-fourth of the island at any one time — as your character moves. so the picture scrolls. Hmm... shades of *Ant Attack* perhaps? Whatever the answer, it won't be known until the game is finally launched some time in early October, at a cost of either £5.95 or £6.95.

Conversion seems to be the name of the game for software houses trying desperately to come up with the new and interesting. For example, Software Projects — the *Jet Set Willy* outfit — is currently planning to convert some of Sierra On-Line's programs for the Spectrum. Sierra, by the way, is better known for its elaborate packaging, which often includes all manner of extras along with the program itself.

Another company on the conversion bandwagon is Bubble Bus. It's about to transfer its popular pool program, *Hustler*, from the Commodore 64 to the Spectrum. This is scheduled for release some time in September, for £6.99.

CLOSE TO THE EDGE

A creative group comprising programmers, graphic artists and musicians has broken away from its parent company, Softek International, to form an independent division. Called The Edge, it's already boasting four new titles, two of which — *Starbike* and *Psytraxx* — are designed for the Spectrum.

Costing £6.95, *Starbike* is described as taking place in a space arcade setting; your mission being to pick up aliens and transport them from planet to planet. The other, and certainly the more interesting, package, *Psytraxx*, uses a software technique dubbed 'synergy' which, according to The Edge's Marten Davies, "is a method of shovelling as many screens as possible into a game." And it seems to work as you'll find an amazing 1026 rooms in it! The plot of the game is that you are a small, overworked droid, drifting around inside a robot's brain in search of the malignant CPU.

Both titles are due for launch sometime in September — look for them in the shops or, if you prefer, you can get closer to The Edge on 01-240 1422.

CUT IT OUT

Computerworld of Beckenham in Kent have just announced their new Reset Switch Box for the Speccy. The idea of buying a reset switch may not be that inspiring, in fact you could probably build one yourself, but you can have this professional looking unit for only £4.49.

The reset switch is available from many dealers or direct from Computerworld at 208 Kent House Road, Beckenham, Kent BR3 1JN. Phone 01-778 0479.

DOMARK GOES HUNGARY

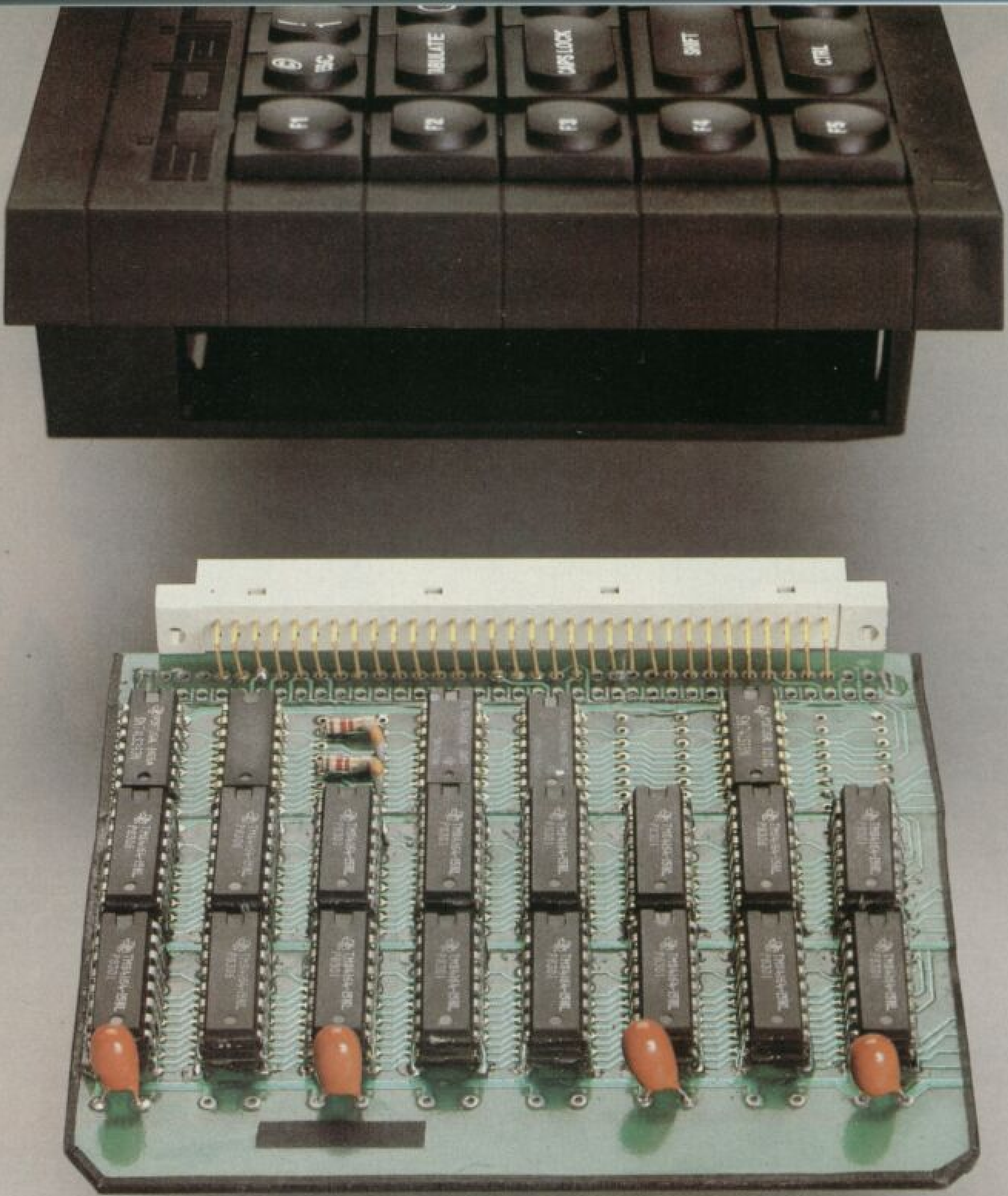
In this world's oft-fruitless search for value for money, a new software package from Domark shouldn't be ignored — especially as the company's been offering £25,000 to the person who can unravel its mysteries. No . . . don't rush out and buy a copy yet — at least not until you've read this. The prize was offered at the Personal Computer World Show from the 20th to the 23rd September, so you've probably missed it.

Anyway, the jewel in the Domark crown is *Eureka* — a new real-time adventure and arcade game, described as the culmination of more than 10,000 man-hours of work by Hungarian programmers. With its five adventure games and five arcades (coming on just the one cassette) it's full of riddles, puzzles and clues, plus there's a colour illustrated book. Ideal, it's hoped, for Christmas! At the time of going to press, no further details could be prised from Domark. All, however, will be revealed soon.

BOARD UPDATE

Back in the bad old days (about five years ago), when you had to build your own personal computer, this sort of keyboard appeared every week. The Kappa Keyboard replaces the top half of the Spectrum and requires only the two usual connections to the computer with five screws through the existing holes securing it to the base. The keytops are DIY (you put the bits of paper under the plastic covering) and although the board supplies a number of extra keys, they're all rather tightly packed. The Kappa Keyboard also supplies two extension sockets — one either side of the keyboard — which give access to the data and address lines. Although they're primarily there to allow for a keypad add-on, the sockets also double as joystick ports. The keyboard costs £48 (including mailing and handling) and is available through mail order only from Kappa Keyboards at 14 Pauls Mead, Portland, Dorset DT5 1JZ.





Quarter Megabyte More

Designed and produced for the Sinclair QL enthusiast, this ingenious little memory expansion board gives you an extra 265k bytes of computing power to your existing system.

The majority of home computers have an in-built potential of using more memory than they are actually fitted with. The new memory expansion board from Simplex Data Ltd, takes full advantage of that wasted potential enabling you to expand your system — creatively! Two quarter megabyte memory expansion boards can be slotted together to expand your system to a further 512k bytes, giving you half a megabyte more.

Costing only £198.00 (inc. VAT, postage and packing), this unit is simple to use, just remove the port cover located at the end of the Sinclair QL Keyboard and slot the unit in, replacing the port cover after insertion.

Exclusively available from Simplex Data Ltd.

TO: SIMPLEX DATA LTD, FREE POST, 432 GREENFORD RD, GREENFORD, MIDDLESEX, UB6 8SG

Please send me: ________ (qty) QL Memory Expansion Unit(s) at £198.00 (inc. VAT, Post and Packing) I enclose Cheque/Postal Order for £ ________

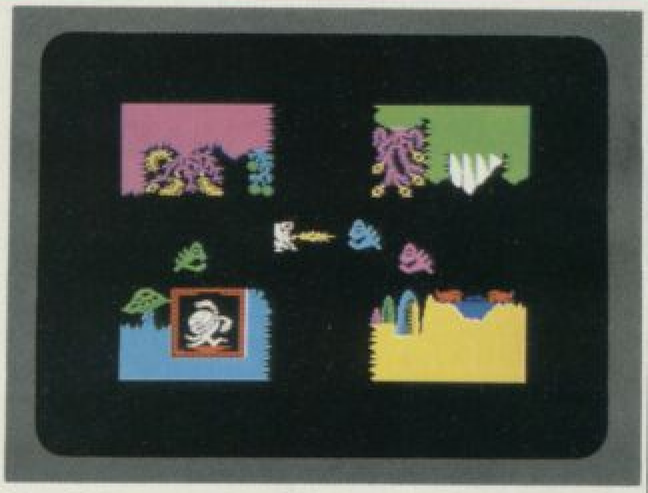
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THE FALL AND RISE OF ZIGGY



One of the many colourful caverns Ziggy must visit before he can save the universe.

Armed with fresh inspiration, Fantasy Software has dug up cartoon character Ziggy for its new game *The Backpacker's Guide To The Universe Part 1.* Described as the first in a trilogy of games that step into the interactive arcade/adventure arena, you'll be treated to a wide variety of caverns to visit as you guide Ziggy in the ultimate quest.

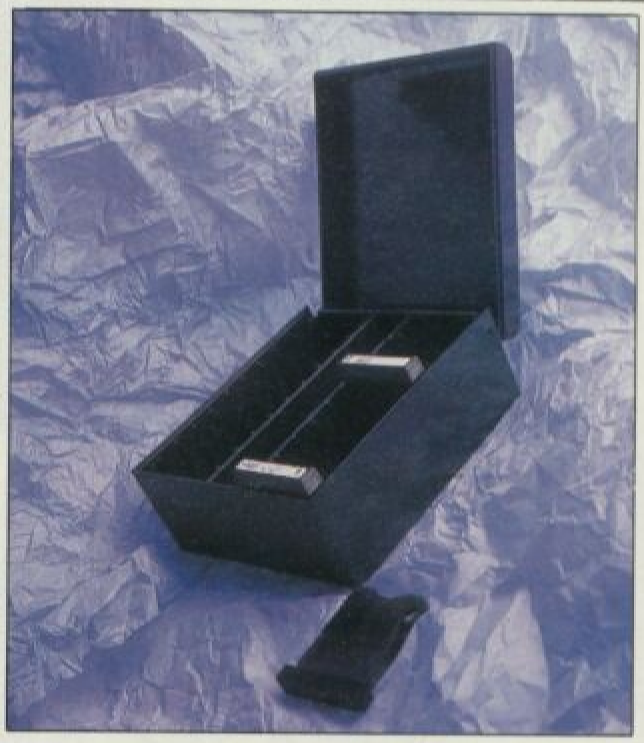
The idea here is that Scarthax — the villain of Doomsday Castle — has returned having located the great plug of the universe (*another software house obsessed with bathroom humour? Ed.*). Our intrepid hero Ziggy has a mere 24 hours to assemble his merry men, collect the 'one lock' and 'one key' (no, don't ask!) and then face Scarthax just in time to prevent Oh Evil One from pulling the plug on the universe.

The game is a double-sider, the first side containing some very complex instructions, the other containing the game (with a brief summary of the weapons, etc, you have at your disposal available at the touch of a key). Fantasy is planning to give this one lots of customer support. It's even creating a Backpacker's Club where users can swop things. *The Backpacker's Guide To The Universe Part 1* should have materialised in a micro shop near you. 42 I say!

TERRA-HAWKS

Some may be old enough to remember *Thunderbirds*... many more will know of *Terrahawks,* the series created recently by Gerry Anderson of TV puppet show fame. Those who took to the programmes (or who're upset at missing them) may like to try their hand at the *Terrahawks* computer game for the Spectrum.

It's been written by Richard Taylor and released by CRL. Taylor has created a 3D simulation described as "uncannily similar" to the opening sequence of the television series. *Terrahawks* will be available in the usual retail outlets for £6.95.



Suddenly it's the Microdrive storage box bonanza. Yes, everyone seems to be doing it and the latest model for holding those delicate little cassette-ettes is from Transform (you know, of keyboard fame). With room for 20 cartridges and extra space for index cards, dead insects and so on, at £5.95 (including postage and packing) it's not a bad buy. Phone 089-283 4783 for details.

SINCLAIRWATCH

By the time you read this (according to those who ought to know) the QL will be available in the shops and mail order will have ceased. Sinclair Research has realised that, after all the cock-ups, it just had to make it available on the high street shelves before Christmas to stand any chance of selling in quantity. However, there won't be that many — Nigel Searle has admitted that "demand will exceed supply", for both the QL and the flat-screen TV (which is being retailed at the same time). The flat-screen TV is an even longer running saga than the QL. It was launched just under a year ago and only a few have been sold by the notorious mail order (potential customers were spared the heavyweight advertising campaign). At least early deliveries have shown that the device isn't bug-ridden!

We should, in theory, have seen the last of the kludged QLs. As I write this, the first customers are being given the opportunity of sending their prototypes back to the Camberley mailing house for upgrading. The whole process is 'guaranteed' to take less than 10 days, though what happens if it takes any longer is not specified. Although the upgrade actually only takes about five minutes to complete, the 10-day stipulation is a result of the QLs being returned to the 'wrong' place. The Camberley office takes the machines and bundles them off to Thorn EMI — which accounts for at least some of the 10 days.

The *User Guide* supplied at present makes hilarious reading to anyone who knows anything at all about Basic — it's packed with misprints and general inaccuracies. Wags have been hazarding that the thick tome must have been proof read by a one-eyed Norwegian *(No offence to our Norwegian readers. Ed.)* in a dimly lit room. It's clear that as the Basic was changing so rapidly, the authors of the manual didn't really know what was included in the machine and what was not. The result is that many commands are inaccurately described, and several are missing altogether. Early QL owners have not just been used as a development facility for the machine, but also as proof readers!

After a long battle, it's been decided that the QL is not to become the next BBC micro. It's been an uncertain couple of months, but at last the Beeb has decided to stick with Acorn's rapidly ageing device and its promised processor add-ons. In many ways, the decision is curious. The QL has most of the hardware/software qualifications of the Model B, as well as being launched with a bug-ridden O/S, long delivery delays and accompanied by the non-appearance of promised peripherals — all quite reminiscent of the Beeb's own machine.

A company called GST was commissioned last year to write an operating system for a machine that was to become the QL. This it did, but eventually it was decided not to use the end result and Sinclair Research's own O/S was chosen instead. GST is now going to be selling its product as an alternative to QDOS. The reason, it transpires, for the refusal was that GST had exceeded the memory limit by about 2K — ironic considering that Sinclair Research itself was exceeding the limit by a huge 9K by the time of release!

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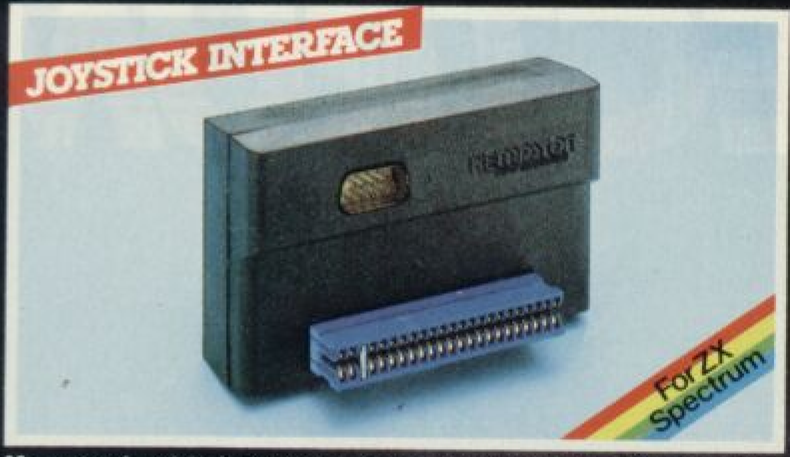
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TURBO

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Peripheral perfection



No more fumbling with the game control keys, now you can have joystick control on the ZX Spectrum. The Kempston joystick interface allows all joysticks in the Kempston range (and others that are Atari compatible) to be used with the Spectrum. Simply plugs into the edge connector.
No modifications necessary. **ONLY £11.50**



Compatible with ZX Interface 1 the Pro-Interface has three 9-way D Sockets. Two of the sockets allow compatibility with Sinclair/Psion software whilst the third offers the dual facility of both Kempston joystick software and cursor key software. The Pro-Interface also features a cartridge slot for ROM based software. **ONLY £19.95**



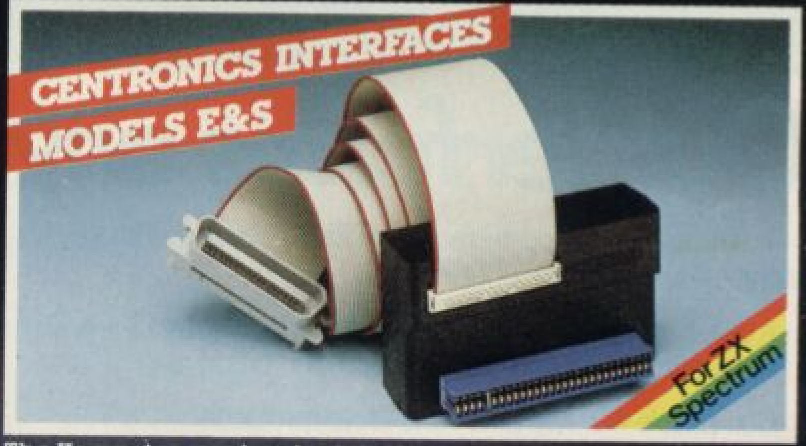
Maximum arcade quality features at a reasonable price. Features: □ Top fire button for one handed thumb control □ Trigger button for one handed index finger control □ Base fire bar for left or right handed control □ 8-way arcade quality leaf switches □ Rubber return action □ 1.5 metre cable. Commodore and Atari compatible. See joystick interface for Spectrum compatibility. **ONLY £12.75**



At last an RS 232 interface for the ZX Spectrum allowing connection to any printer which follows the RS 232 protocol. The interface has its own EPROM allowing the use of keywords LLIST, LPRINT and COPY. We recommend the Brother EP44 Printer for use with this interface.
Interface complete with cable and connector **ONLY £45.00**



The ultimate joystick for the home computer. Features: □ Ergonomic design and nylon covered steel shaft □ 8-way arcade quality leaf switches □ Dual fire buttons for left or right handed play □ Rubber return action for smoothness □ 1.5 metre cable.
Commodore and Atari compatible. See joystick interface for Spectrum compatibility. **ONLY £13.50**



The Kempston centronics interface will allow you to utilise a vast range of printers with an industry standard centronics input port on the ZX Spectrum. **Interface E** has all operating commands held in an EPROM, so plug in and its ready to use. **ONLY £49.99** **Interface S** offering similar features as above but software routines are provided separately to initialise the interface before use. **ONLY £35.00**

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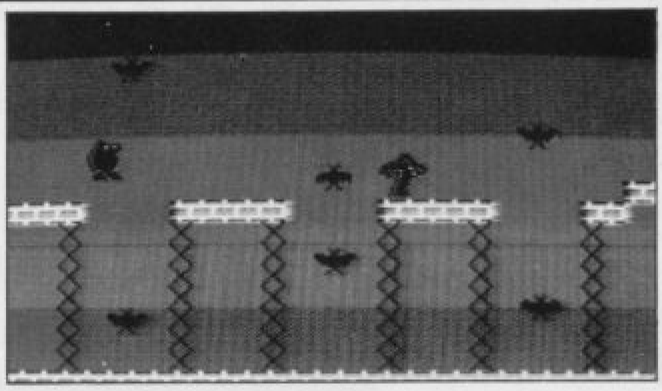
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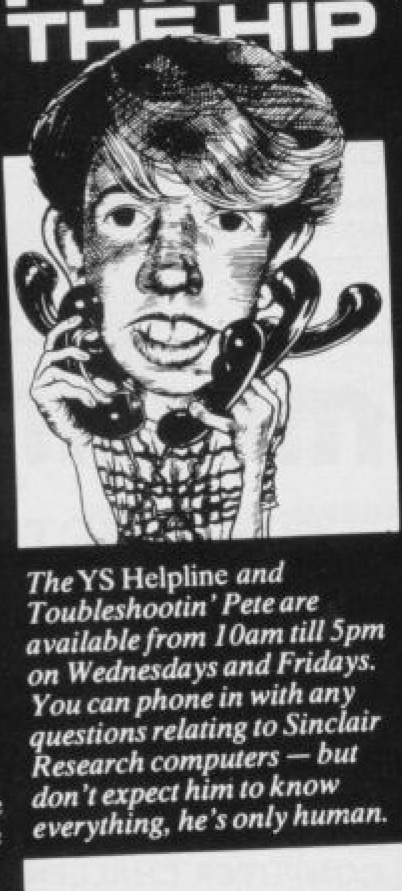
INDIANA CLONES

Far be it from us to say that it's mean to jump on someone else's bandwagon, but no guesses where Electric Abacus found its inspiration for *Curse of the Flying Pigmies*. Still confused? Well, the original title was *Indiana Smith and the Temple of Bad Luck*. Geddit?

The game boasts 16 or more screens and no fewer than 45 sixteen by sixteen sprites. The aim is to find the legendary Diamond of Death within the usual time limits. Hidden within the program are secret passages and messages, as well as a couple of traps. Squeamish readers will be relieved to hear there are no snakes or creepy crawlies — as far as we know! Three other 'spin-off' games are also planned.



FROM THE HIP



The YS Helpline *and Toubleshootin' Pete are available from 10am till 5pm on Wednesdays and Fridays. You can phone in with any questions relating to Sinclair Research computers — but don't expect him to know everything, he's only human.*

The 'flavour of the month' question is one relating to the *ZIP* compiler. I've had a number of enquiries from readers wanting to know where those *ZIPs* are. Well, we don't actually send them off from here — in fact, all we're doing is acting as a clearing house for orders. Despatch is dealt with by Simon Goodwin himself in Birmingham, so this might be the cause of some delays. Simon assures us that he's sending off the compilers at a pretty rapid rate. One cause of delay has been readers who've mixed payment for *ZIP* with other offers in the magazine. Some people have been known to put subscriptions, back issues and *ZIPs* all on one cheque! The *ZIP* compiler is Simon's own baby and the cheque *must* be made out separately to *'Zip Compiler Offer'*.

The next thing which has been cropping up on the phone with increasing regularity is the question of which QL has the final version of the ROM in it? Is it AH or JM? A man called 'Alec' from Sinclair Research's office in Camberley reports that JM is definitely the final version; on the other hand, higher authorities at Sinclair Research told us only a month before that AH was to be the 'last word'. I suppose a month *is* a long time in the QL's history.

The bane of my life lately has been people ringing in to ask me for the POKE's on *Sabre Wulf* — well, I don't know the POKEs ... honest! The person to get in touch with is Andrew Pennell who's setting up a 'Hacking Away' column, the first of which is in this issue.

Any contributions will be gratefully accepted, so write off to Andrew at Hacking Away, *Your Spectrum*, 14 Rathbone Place, London WC1P 1DE.

A Mr Messing from Hemel Hempstead phoned in to say that he'd studied the Hippodrome competition with great interest but wanted to know whether there is a method of saving SCREEN$ in high memory and then bringing them down on to the screen, one after the other, so as to produce animation.

That much I *can* give away, but you'll have to work out the SCREEN$ yourself if you want to enter the Logo Competition. All you have to do is use this short machine code routine:

```
LD DE, 16384d
LD BC, 6912d
LD HL, (address in memory where
you have stored your SCREEN$)
LDIR
```

This will quickly zap across your screen in the required manner.

David Williams from Cardiff has been asking for a few system variable POKEs, firstly the one which stops the Speccy putting that annoying 'Scroll?' prompt at the bottom of every screen, and secondly the POKEs to tell you how much memory there is left in the machine.

The answer to the first question is easy. POKE 23692,-1 at regular intervals is the solution. The second problem needs a little more complicated PEEKing to sort out, but this line should do it. It returns the amount of K left to two decimals places:

```
9999 PRINT (INT(((PEEK
23730+256*PEEK23731-
PEEK 23653-256*
PEEK 23654)/1024)*100))/100;"K"
```

Changing the subject entirely, there have been a number of enquiries about John Flenley's Centronics article, *Facing Up To Printers*. On page 31 John says, "we have A6 and A7 low and the rest high — that is 11011111 or DF in Hex..."; certainly there's something odd here. Instead of DF it should be 3F and the binary number should be 00111111. Got it? Good.

OK, that's it for this month — catch you on the phones.
Troubleshootin' Pete

MANUAL DEXTERITY

If you believe that every computer is irreconcilably different from any other, then let this new manual explode your delusions. Described (by the publishers of course) as "the book the manufacturers should have written in the first place", its aim is to explain basic computing concepts in a step-by-step order.

You're told clearly what each instruction does, when and how to use it, the history behind it and how various machines differ. The book is sort of disk-sized with wipe clean covers — useful for those moments when you feel like slitting your wrists. The Micro Manual is priced at £9.95 (soft cover), or £14.95 (hardback). You'll find it at WH Smith and lots of other places.

DELIVERING THE GOODS

Terry Blood Distribution have recently signed a distribution contract with Sinclair Research, thus joining Prism in the effort to get Sinclair product to the masses.

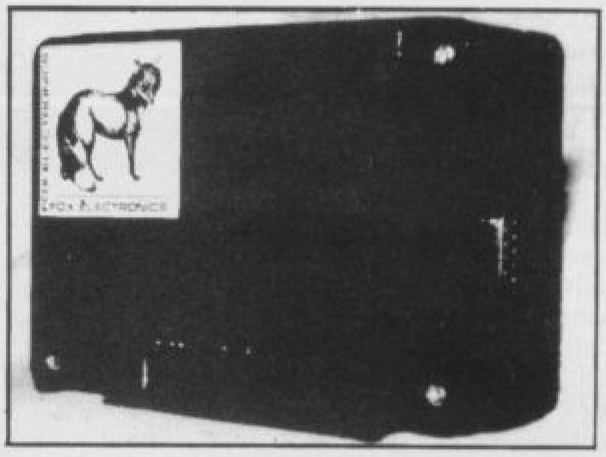
TBD already have plenty of experience of handling overnight nationwide delivery of records, cassettes and videos, but want to be more than just a 'shift it' company when it comes to computer software and hardware. They have recruited six local youngsters to spend Saturday afternoons joystick-bashing to test various new games releases before they are added to TBD's stock. Other packages will be looked at by lecturers and teachers.

TBD will be distributing all of Sinclair's current products as well as the QL when it becomes available.

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QL AFFAIRS

Presented by Leon Heller, Chairman of the Independent QL Users' Group (IQLUG).

WORD ON QDOS

Users curious about how the QL works can get a full set of documentation for £35 (inclusive) from: QJUMP, 24 King Street, Rampton, Cambridge, CB4 4QD. QJUMP is Tony Tebby, who wrote QDOS for Sinclair. He's now left Sinclair Research and has acquired the distribution rights to the QL documentation. Be warned! The documentation will not be of much use to you unless you are an experienced MC68000 assembly language programmer! You also need access to a MC68000 assembler or cross-assembler; hand-assembly of MC68000 code is not recommended if you value your sanity!

Incidentally, I managed to get a copy of the QDOS documentation out of Sinclair Research, and it is quite excellent, which is more than can be said for some of the books published on the QL.

QLUB SPACE

The QL User's Bureau (QLUB), Sinclair Research's much-vaunted users' group for the QL has at last managed to produce its first newsletter, entitled *QLUB News.* It's a slim document, comprising of just four pages, and a large proportion of this 'magnus opus' consists of blank space.

Sinclair Research invites contributions from QLUB members and asks that letters be kept as brief as possible — presumably so that it can maintain an editorial policy of 50 per cent text and 50 per cent space in subsequent issues!

GOOD CONNECTIONS

There are those who would wish to use an RGB colour monitor with their QL, and who are encountering some difficulty in making up a suitable cable (they don't seem to be available from Sinclair Research yet). The hard-to-get eight-pin DIN plugs are obtainable from: Maplin Electronic Supplies Ltd, PO Box 3, Rayleigh, Essex SS6 8LR. The code to order is: FG40T (DIN Plug 8-pin) TQ 100; and the price is a mere 62p each. In fact, they're still hard-to-get since Maplin is out of stock as I write this, but at least you now know another source to order them from when supplies become plentiful.

SOFT UPDATE

Bristol software house Metacomco is producing a range of languages for the QL. Its first offering is likely to be an assembler and editor, followed by BCPL and C compilers ... and, for when the 0.5M memory expansion materialises, a LISP interpreter. They'll probably sell for around £100 each.

Sagesoft has completed its accounting software to run on the QL, the result to be marketed by Sinclair Research. The whole caboodle is likely to be quite expensive, however.

For some inexplicable reason, the software is not integrated with the Psion suite.

TERMINAL STUFF

Member of IQLUG, Jeremy San, has written a terminal emulation program for the QL which will shortly be placed in the group's software library. Written in assembly language, the program's being 'tarted up' to allow the uploading and downloading of Microdrive files. Because of the limitations of the QL serial ports, Jeremy's been unable to make the program function satisfactorily with the standard 1200/75 baud Prestel service, but it works fine with a standard 300 baud modem for accessing computerised bulletin boards.

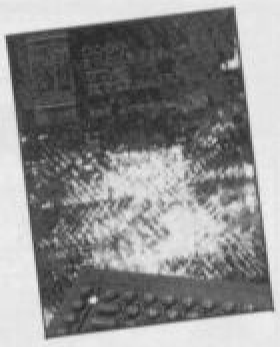
ANYONE FOR UNIX?

Sinclair Research is thinking seriously about putting the UNIX operating system on the QL. UNIX has hitherto been available only on minis and up-market micros like the Fortune. The QL will need the 0.5M RAM expansion and a sizeable hard disk (30M or so), but the move could make the QL a very popular machine with the universities.

IQLUG is a non-profit making independent QL users' group. Further details on the organisation are available from: *Brian Pain, Acting Secretary, IQLUG, 24 Oxford Street, Stony Stafford, Milton Keynes, Bucks. Tel: 0908 564271.*

BOOKING UP

Longmans the publishers seems to have won the race to produce the first *decent* replacement for the shoddy QL style books that have been filling the bookshelves since (as well as before) the infamous machine's launch. *Good Programming with Sinclair QL Basic* is by Roy Atherton and takes the reader through from basic principles to explaining the stuff that the QL manual didn't make clear. Each chapter provides useful, if not essential, information for those who want to learn SuperBasic in a step-by-step way, instead of trying to follow the User Guide's leaps from keyboards to concepts and back again.



Each section has a self-test so that you can judge how you're progressing and the bibliography is a good indication of how much work has gone into preparing this book.

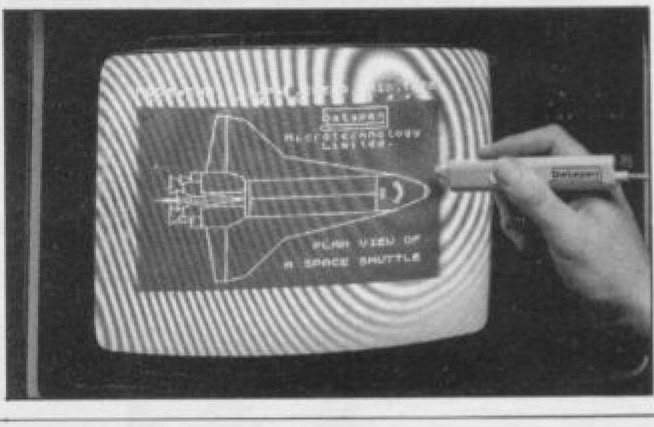
Good Programming with QL SuperBasic costs £5.95, its ISBN number is 0 582 29662 5, and it should be in your bookshop now.

LIGHT READING

Oh no, not another lightpen I hear you cry! Sorry, but yes. Datapen Microtechnology Limited have launched what they claim is the best lightpen so far for the Spectrum.

Why do they make such claims? Well, so far the best accuracy other pens can manage is to one character block. Datapen claim *pixel* accuracy. The lightpen circuitry itself and the software supplied (there is a drawing program available) is supposed to be a whole lot better than you'll usually find. Well, unless your using a 20" telly, it's difficult to see how pixel accuracy can be achieved considering the size of the tip of the Datapen. Nonetheless it has a nice feel to it and is of a much more professional quality than some other pens.

What's the damage? Only £29 including VAT and post and packaging, were from? Datapen at Kingsclere Road, Overton, Hampshire RG25 3JB; where else!



THE YS TOP 20

Here's the result of those voting slips you've sent us during August — all your favourite games on the Spectrum. Remember to keep sending us your votes ... how else are we going to make it the only chart worth looking at? And, as an added bonus, first voting slip out of the hat will win a clutch of cassettes. The winner this month is André Tabrizifar of Wirral, Merseyside.

As with last month, you'll find room to make your personal comment on each of your five top 20 votes.

One more thing. Observant readers may notice that we're still asking you to fill in the Turkeys form, yet it's not in Frontlines this issue. That's because we're saving all your votes up 'till the December issue so we can do a bumper chart. Nuff said!

Post all entries to *YS Charts, Your Spectrum, 14 Rathbone Place, London W1P 1DE.*

YS TOP 20 READER POLL

My top five raves on the Speccy are:

1 ____________________
Comments ____________________
____

2 ____________________
Comments ____________________
____

3 ____________________
Comments ____________________
____

4 ____________________
Comments ____________________
____

5 ____________________
Comments ____________________
____

My three top turkeys for the Speccy are:

1 ____________________
2 ____________________
3 ____________________

Name ____________________
Address ____________________
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____
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I understand that when this chart was tested — eight out of ten owners said their Spectrums preferred it. (*What? Ed.*)

YS TOP TWENTY
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YOUR SPECTRUM

YS TOP TWENTY CHART

THIS MONTH	LAST MONTH	MONTHS IN CHART	TITLE	COMMENT
1	3	2	**SABRE WULF** ULTIMATE	"SABRE WULF WINS BECAUSE OF OUTSTANDING GRAPHICS, AND A NOVEL ADDITION TO THE MAZE LAYOUT." **DAN ROMER, MONMOUTH**
2	2	5	**JET SET WILLY** SOFTWARE PROJECTS	MINER WILLY IS STILL CLINGING TO THE PRECARIOUS NUMBER TWO POSITION. HOW LONG CAN HE LAST?
3	10	5	**ATIC ATAC** ULTIMATE	A GRAPHICAL ADVENTURE THAT'S FULL OF SPOOKS — IN AN ARCADE-TYPE FORMAT.
4	NEW	1	**PSYTRON** BEYOND	INTERFACE YOUR BRAIN WITH A MASSIVE COMPUTER AND FIND OUT HOW A DEEP SPACE INSTALLATION IS RUN.
5	1	4	**LUNAR JETMAN** ULTIMATE	MOON MADNESS ON THE FROZEN WASTES HAD ITS MOMENT OF GLORY LAST MONTH — NOW IT'S SINKING FAST.
6	18	5	**CHUCKIE EGG** A & F	COLLECTING EGGS DOWN ON THE FARM IS STILL AS POPULAR AS EVER.
7	4	5	**MANIC MINER** SOFTWARE PROJECTS	WILLY'S FIRST ADVENTURE — COMING AT LAST TO THE END OF ITS SUCCESSFUL RUN.
8	9	5	**SCUBA DIVE** DURELL	JACQUES COUSTEAU WOULD LOVE THIS ONE; SLIP INTO YOUR WETSUIT AND JOIN THE FUN.
9	NEW	1	**OLYMPICS** STORM SOFTWARE	RELIVE THOSE SLEEPLESS NIGHTS WITH THIS NOVEL DOSE OF OLYMPIMANIA.
10	8	5	**FIGHTER PILOT** DIGITAL INTEGRATION	YOU DON'T NEED A PILOT'S LICENCE TO FLY AROUND THIS GAME — JUST NERVES OF STEEL.
11	15	6	**CHEQUERED FLAG** PSION	IF YOU LIKE FAST CARS AND RACING CIRCUITS... THIS ONE'S FOR YOU.
12	NEW	1	**BEAR BOVVER** ARTIC COMPUTING	NEW TO OUR CHARTS — A GAME THAT'S MORE TO DO WITH TEDDY BOYS THAN TEDDY BEARS.
13	19	2	**LORDS OF MIDNIGHT** BEYOND	A MULTI-SCREEN GRAPHICAL ARCADE ADVENTURE ON THE LINES OF THE HOBBIT
14	20	4	**WHEELIE** MICROSPHERE	IT'S EITHER THEM OR YOU: STEER YOUR BIKE THROUGH THE TWISTING MAZE TO ESCAPE THE GHOSTRIDER.
15	5	2	**MUGSY** MELBOURNE HOUSE	IT'S TOUGH AT THE TOP. YOU'RE THE 'BAWSS' OF A MAFIA MOB IN THIS 1920'S RE-RUN.
16	NEW	1	**STOP THE EXPRESS** SINCLAIR RESEARCH	YOU'VE GOT TO STOP THE EXPRESS BEFORE IT REACHES THE BORDER AND CAPTURE ALL THE BAD GUYS.
17	NEW	1	**ANTICS** BUG-BYTE	BARNABY THE BEE MUST RESCUE HIS STUPID MATE BORIS FROM THE ANT'S NEST.
18	7	2	**WORLD CUP** ARTIC COMPUTING	FOR FOOTBALL FANS EVERYWHERE. RECREATE THE THRILL OF WORLD CUP MATCHES.
19	6	4	**TRASHMAN** NEW GENERATION SOFTWARE	IT LOOKS LIKE THAT OVERWORKED DUSTMAN IS JUST ABOUT TO BE THROWN OUT OF THE CHARTS ALONG WITH THE GARBAGE.
20	NEW	3	**FOOTBALL MANAGER** ADDICTIVE GAMES	TRY AND GUIDE YOUR TEAM THROUGH TO THE TOP SOCCER TROPHIES.

JOHN HALLET



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FORUM

Is there something you're not telling us? Write to Forum, *Your Spectrum*, Rathbone Place, London W1P 1DE.

DIGGING ONE'S OWN GRAVE

After visiting a certain computer stockist in Belfast, I felt compelled to write to you on the subject of software piracy.

We all realise it's reached epidemic proportions and it's hardly surprising that program authors are trying to take practical steps towards halting this illegal practice. But already we're seeing ads in magazines which allow user access (for instance) to *Jet Set Willy* — without having to use the colour card. While in the Belfast shop, I saw a young assistant demonstrating CBM 64 joysticks and distinctly heard him offering a prospective customer a copy of *The Hobbit* for £1.00. If this is not utter stupidity, I don't know what is. Not only is he cheating Melbourne House of sales, but he is also damaging the reputation of the shop in question — which shall remain nameless. (*Perhaps it shouldn't. Ed.*)

I therefore call upon all software houses who have recently raised their prices in an attempt to curb piracy to reconsider their actions. It's not the computer users who copy software, but assistants in shops who are willing to uphold this illegal practice. They should stop this stupidity at once, for the sake of their own trade! I'd be interested in hearing what other angry users have to say about this.

Chris Hall, Belfast

CUT PRICE STORE

Have you noticed the ads recently for a storage box for Microdrive cartridges — for around £7! I've been using a similar system for the past six months. I bought four interlocking boxes from a local tool shop — I imagine the system was originally intended for storing screws, etc — and each holds 14 cartridges. All this for around £3.50.

My advice to anyone still looking for a suitable storage system for their Microdrive cartridges is to check out the nearest DIY centre.

KJ Wheeler, Eastleigh

DILATED DUMPS

I've made certain modifications to your *Dumps of Distinction* program featured in issue 4 so that it now works on the Shinwa CP80 printer.

At first, the line feed distance seemed too long, giving circles an elongated appearance. I tried altering the code for the LF to 2/72, but this made the circles too short in the horizontal direction. Whilst perusing the printer manual, however, I noticed that the LF could be set at N/216 which has certainly made the dumps a bit better.

Nick Lytton, London N10




```
 100 CLEAR 32349
 110 RESTORE 1000
 119 REM POKE the set up routine
 120 FOR i=32350 TO 32369
 130 READ a: IF a=-1 THEN  GO TO 150
 140 POKE i,a: NEXT i
 149 REM POKE the routine itself
 150 LET c=0
 155 FOR i=32370 TO 32531
 160 READ a: POKE i,a
 170 LET c=c+a
 180 NEXT i
 185 IF c<>12677 THEN  PRINT "DATA ERROR": STOP
 190 FOR i=32532 TO 32599
 200 READ a: IF a=-1 THEN  GO TO 220
 210 POKE i,a: NEXT i
 220 PRINT "FINISHED"
 230 POKE 32478,205: POKE 32479,20: POKE 32480,12
7
1000 DATA 1,191,227,62,129,237,121,62,15
1010 DATA 237,121,24,7,-1
1100 DATA 62,27,205,20,127,62,51,205,20
1110 DATA 127,62,8,205,20,127,14,0,62
1120 DATA 27,205,20,127,62,75,205,20,127
1130 DATA 0,0,0,0,0,62,16,205,20
1140 DATA 127,62,2,205,20,127,6,0,197
1150 DATA 205,170,34,71,4,62,1,15,16
1160 DATA 253,166,8,124,15,15,15,230,3
1170 DATA 246,88,103,70,8,120,32,3,15
1180 DATA 15,15,230,7,33,244,126,135,135
1190 DATA 95,22,0,25,6,3,126,205,20
1200 DATA 127,35,16,249,193,4,120,254,176
1210 DATA 56,199,62,13,205,20,127,62,10
1220 DATA 0,0,0,12,32,159,62,27,205
1230 DATA 20,127,62,65,205,20,127,62,12
1240 DATA 205,20,127,201,224,224,224,0,192
1250 DATA 96,192,0,160,64,160,0,32,64
1260 DATA 128,0,96,0,96,0,64,0,64
1270 DATA 0,0,64,0,0,0,0,0,0
1280 DATA 243,197,1,191,226,30,14,237,80
1310 DATA 203,66,32,250,6,224,237,121,6
1320 DATA 227,237,89,28,237,89,251,205,84
1330 DATA 31,210,0,13,193.201,-1
```

If you'd like to get some distinctive dumps out of your Shinwa CP80 printer á la Nick Lytton, this code is what you need.

WHO'S A CLEVER BOY?

I am a follower of that great language Basic. However, after reading the *Hacker's Guide* in issue 4, I collected all 83 objects in ... ssshh, you know what ... with the help of the map and 18 of my own POKEs (including two from Software Projects which make the Banyan Tree and Conservatory Roof possible). Some not published are POKE 35899,0 (immunity to arrows) and those to get the first landing object — 56347,0; 56350,0; 56357,170; and 56358,170. For a larf, try POKE 36901,85 or POKE 37805,60. Tee-hee!

Encouraged by my machine code success, I even tackled the error in *Graphic Definitions* (issue 6) and came up trumps.

One last thing, have you thought of having a prize for the star letter of the month?

David Fox, Alverstoke

Great, keep sending those POKEs in — but not to Forum, send them to Andrew Pennell who's going to be looking after our Hacking Away column in Frontlines. As to your question ... the answer's 'Yes'. Ed.

ON ERROR GO TO ...

Thank you for printing my letter in August's *Forum*. However, you may have had some irate readers telling you that it doesn't work — since you omitted the last four lines! The missing lines are as follows:

```
4996 GO TO scan
4997 LET line = PEEK (a+1) + 256 *
     PEEK a: RETURN
4998 LET len = PEEK (a+2) + 256 *
     PEEK (a+3): RETURN
4999 GO SUB peekline: GO SUB
     peeklen: LET nextl = a
     + len + 4: RETURN
```

Don Smith, Kirbymoorside

Sorry 'bout that. Ed.

A MINER KEY?

After reading your article about *Jet Set Willy* in issue 4, I must ask: why have the Software Projects covers for the initials NCB? Is it 'National Computer Board' or have they gone a bit over the top with the success of 'Miner Willy' games and affiliated themselves to the National Coal Board? Please tell us it's driving us up the wall!

Matthew Paul & Mark Freeman, Weymouth

Aaargh! Its' driving me mad now!! Ed.

GRAPHIC EXPLANATIONS

After Toni Baker's comments on self-modification in *Graphic Definitions, YS* issue 6, it's ironic that a bug should have crept into the object code about halfway through the section headed NEW_PIX,

that is the very instruction which modifies CHEAT $-1. The code at 811B (33051 Dec) should read 322881 and *not* 322C81. I wouldn't have spotted the bug had I not taken the bone idle route of using a monitor instead of an assembler. However, what really threw me was paragraph 10 in the 'things you can do' column. For example, 'if the kettle has boiled, make tea'. It hadn't, so I didn't. With 10 defaulting I got a 'variable not found' at 13. Putting 6 a little earlier solved the problem.

Having used the routine to define a set and SAVEd it, I decided to play on, but found the first set a distraction; therefore, I tagged a few bytes on to Toni Baker's code which resets the UDGs to their initial state. The code (implemented by RANDOMIZE USR 33129) is:

```
                ORG 33129
RESET UDG
21083E          LD HL, 3E08      ; 'A' in ROM
ED5B7B5C        LD DE, (UDG)     ; No Comment
01A800          LD BC, 00A8      ; 21 × 8
EDB0            LDIR             ; Sling
C35680          JP START         ; Hi Toni
```

All it does is take characters A-U from the ROM character set by the scruff of their collective necks and sling them into the label, UDG.

Rather than let the Speccy work out where 'A' is via CHARS and a little arithmetic, I've pointed it to 'A' directly in case a user-defined character set is on-board and in use — and so clashing with the data at 8000 Hex. On the other hand, the UDG label is used as the destination should more than one set exist — or if the only UDG is not resident at its usual address.

Anyone who wants no distraction can load HL with 5B00 Hex (the printer buffer) and fill the UDG set with nothing! Those who cannot work without distraction should try loading HL without zero.

Although we are primarily concerned with UDGs, loading HL with appropriate values allows us to have a shufty at any part of the character set and the opportunity to mess around with it.

Lastly, 16K Speccy bods (and 48K Speccy bods who've been flash and placed the main code elsewhere) should note that START in the JumP instruction is as in Toni Baker's routine...8056 Hex.

David Roberts, London.

CASIO QUESTIONS

I am writing in connection with an article from issue 4 of *YS*, concerning connecting of the Spectrum to a Casio Synthesiser. Here are my questions:

1. Could I connect the lead from the Casio straight into my Fuller Master Unit? If so, would the wiring be the same?
2. If you use a cassette recorder do you plug the wire from the Casio into the EAR socket on the cassette recorder and then the MIC to MIC on the Spectrum?
3. Assuming I have everything connected, would I be able to enter a tune on the Speccy and play it through to the Casio, where I could alter it and then SAVE it in tape?
4. Can you play directly on the Casio and then save this on tape through the Spectrum?
5. You say "it will only load monophonic music (although you can play along with it once it's loaded)". Does this mean it plays a tune like the Spectum but with improved quality? Or that once it's loaded you can use this as background music and play along with it?

Sorry about asking all these questions but I'm very interested in the idea and want to know more.

Dale Gregory, Rotherham

To answer your questions simply — 1. No. 2. Yes. 3. No — it's a one-way link from the Speccy to the Casio, and not vice versa. 4. No. (See the answer to question 3.) 5. Once it's loaded, you can use it as background music and play along with it. Until my brother, Sam, comes up with the appropriate code to solve all your problems, that's the situation. Simon Goodwin.

CRAZY FOR CODE

I find your magazine very interesting and of extremely high standard. But, as so many

of your articles require a reasonable understanding of machine code, why don't you run a series to teach machine language to those who know nothing about it?

If you could plan a series explaining the basic principles of machine code, I would be extremely grateful and I'm sure other readers would find it helpful too.

If you are unable to do this, please at least recommend a book on the subject. At present, so much of the literature seems to be aimed towards teaching Basic to beginners.

JP Barker, Cambridge

Unless you're prepared to hang around for a 26-part magazine feature on learning machine code, you'd be best to divert your enthusiasm towards a book. As a magazine, we can provide a number of useful and fun routines through which you can see the power of the language — and hopefully inspire you to better things. That said, there are plans afoot for us to provide you with a basic guide to machine code, but I'm afraid you'll still have to provide the hard work. A few paperback titles to try in the meantime are Practical Machine Code *by Steve Webb (Virgin),* Mastering Machine Code On Your Spectrum *by our own Toni Baker (Interface) and* Understanding Your Spectrum *by Dr Ian Logan (Melbourne House). Best thing to do is lock yourself in your room at the keyboard for a couple of days with all three ... Ed.*

NOCTURNAL ADVENTURES

Although I feel you deserve congratulations for being the first to produce a magazine purely for 'Speccy' owners, I think your mag lacks one essential quality. Being an adventure game enthusiast (Level 9 in particular), I couldn't help but notice the lack of a regular adventure spot.

Could you please set aside a page — or even half a page — each issue for this purpose; I'm sure thousands of fellow *YS* readers will agree that it would make a very worthwhile addition to the magazine.

Meanwhile, may I offer assistance to anyone who needs help with Level 9's *Colossal Adventure, Snowball* or *Lords Of Time* — all of which I have managed to complete. Fellow adventurers can write to me at the address below, or phone at *any* time of the day or night *(Shome mishtake shurely. Ed.)*. I'm always at the keyboard until around 5am!

Neil Mackintosh, Flat 2 up/R, 36 Maryhill Road, Glasgow. Telephone 041-332 2216

Just the sort of loony we've been looking for! Seriously folks, that's what's happening next month ... ace adventurers Peter Shaw and Clive Gifford will be presenting a page of reviews and helpful hints for players stuck at the Gates of Doom not knowing whether to catch the bird or pick up the iron bar. Check us out next month. Ed.

SUPPORT ON SPEC

I want to make a stand in your favour. EG Matthews of Dorset (Nurd, July), I hope you're reading this: SPECCY, SPECCY, SPECCY!

It's this sort of informal approach which makes your magazine appealing to those with any normal sense of humour. I also like the refreshingly witty Ed's comments and your good-natured (?) contempt of the Acorn toy (Ian McNaught-Davies, etc).

Keep all this up 'cos it makes me larf (and not much does these days).

S Rouse (three-year old geology undergraduate), Tarleton

Your cheque's in the post. Ed.

PULL THE OTHER ONE!

Avid readers of Forum *may recall* Jet Set Loony, *from a smart Alec who went into great detail about locations we'd missed in our* Jet Set Willy *review. Well, we had a jolly good laugh at it in the office and wanted to share the joke with you. It seems that more than one reader took it seriously and sat up until 11.45pm (Matthew-time) trying to find the missing locations. So next time we decide to pull a fast one on you, we'll include a hefty pinch of salt with each mag; unless it's April Fools' that is! Ed.* YS

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PAGING ON YOUR SPECTRUM

Hearing that the QL could multi-task was the straw that broke Stephen Adams' creative back. Find out how he's able to offer users the potential of a 4096K Spectrum.

Three things have been on my mind of late. First, that an oft-heard complaint about the ZX Spectrum is that its memory map is all accounted for ... nothing else can be added as it's all taken up by the 16K Basic ROM. Second, that any programs whicn require allocation always seem to choose the same place at the top of memory. Finally, there's the disparate thought that an upgrade to the QL was supposed to be able to allow multi-tasking — that is, two or more programs running at one time — certainly an advantage over the Speccy, but one that now appears impossible without a change in the QL software.

PAGING RAM

With these things in mind, I sat down to consider ways I might expand my 48K Spectrum. Of course I wasn't the first. Other people, for instance, have tried to solve the problem using different pages of RAM. This allows the user to have more than one set of RAM at a particular memory address. As only one set at a time can be addressed by the computer they are rotated into the memory map in turn, like the pages of a book. Information stored in the pages not addressed by the computer are unaffected by any PEEKing or POKEing of the memory addressed.

The problem has always been one of no software existing to run these new pages, and inevitably the user has been left floundering about trying to incorporate them into programs or having to write brand new ones. The other major disadvantage is that ordinary programs can't be run once the system is fitted.

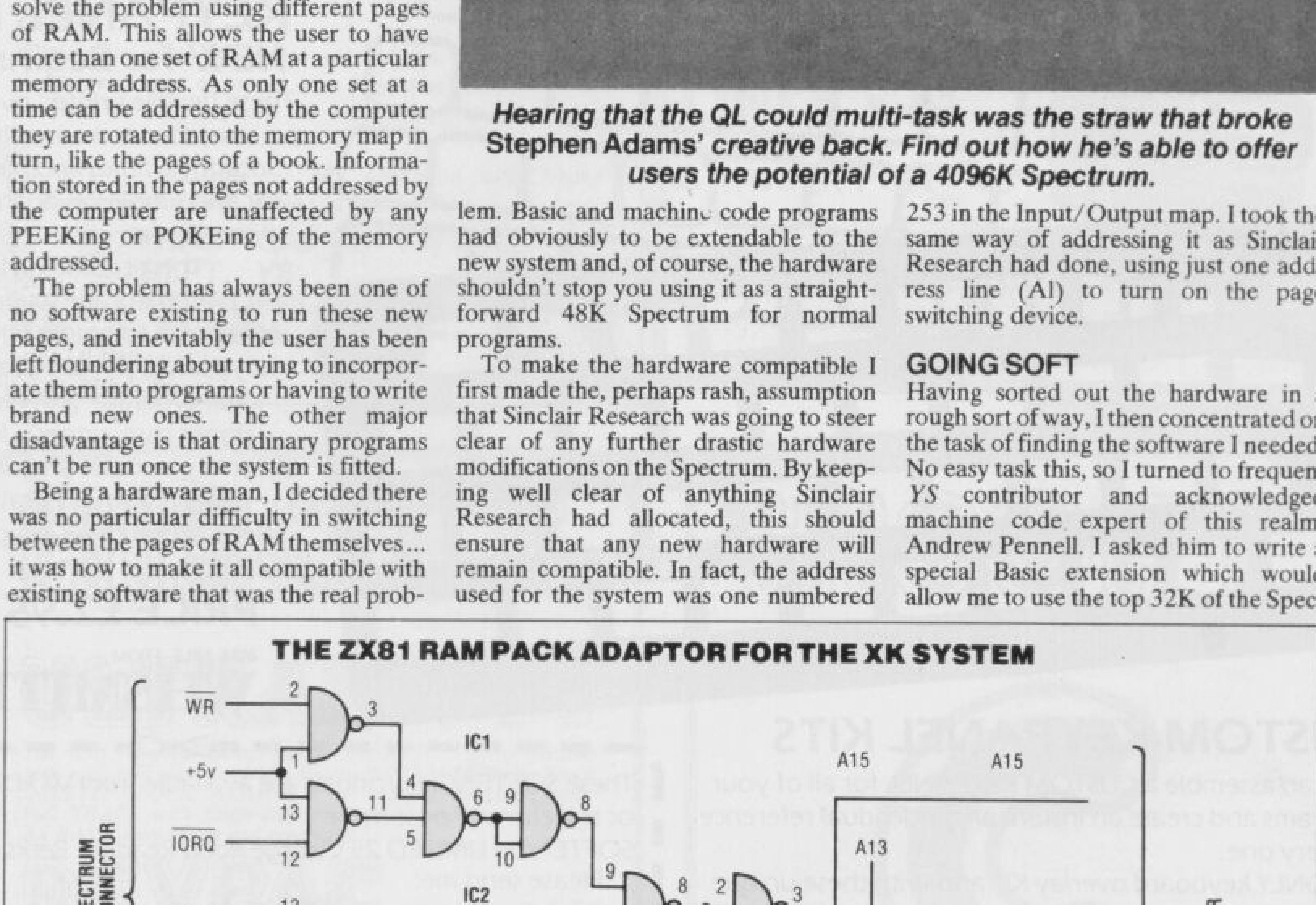
Being a hardware man, I decided there was no particular difficulty in switching between the pages of RAM themselves ... it was how to make it all compatible with existing software that was the real problem. Basic and machine code programs had obviously to be extendable to the new system and, of course, the hardware shouldn't stop you using it as a straightforward 48K Spectrum for normal programs.

To make the hardware compatible I first made the, perhaps rash, assumption that Sinclair Research was going to steer clear of any further drastic hardware modifications on the Spectrum. By keeping well clear of anything Sinclair Research had allocated, this should ensure that any new hardware will remain compatible. In fact, the address used for the system was one numbered 253 in the Input/Output map. I took the same way of addressing it as Sinclair Research had done, using just one address line (Al) to turn on the page switching device.

GOING SOFT

Having sorted out the hardware in a rough sort of way, I then concentrated on the task of finding the software I needed. No easy task this, so I turned to frequent *YS* contributor and acknowledged machine code expert of this realm, Andrew Pennell. I asked him to write a special Basic extension which would allow me to use the top 32K of the Spec-

THE ZX81 RAM PACK ADAPTOR FOR THE XK SYSTEM



The diagram above shows the circuit I used to test out the page switching facility with a 16K ZX81 RAM Pack. The inputs to the 74LS74 (3 and 11) come from the decoder that determines whether the I/O address 253 is being used. The chip then stores the value of D7. The second decoder operates A14 (to turn on the RAM Pack) when the top 32K of memory is addressed and a '1' has been stored in the 74LS74 latch. To prevent it being turned on along with the internal RAM on power-up, the latch is initially set to zero by the reset line. Don't forget that before using the extra pages, use CLEAR 32767 to stop Basic crashing. By the way, the lines not shown on the diagram must be converted from the Spectrum's edge connector to a PCB of a ZX81-type edge connector.

PAGING

ON YOUR SPECTRUM

trum's memory in pages. Different programs could then be switched in and out under software control. The bottom 16K of RAM, containing the screen display, could not be used. It was vital the new operating system went somewhere that was unaffected by any switching of the RAM pages.

Two other specifications were that it could be operated either through Basic or machine code, and that it would have the ability to swop variables between pages. Andrew decided to add a further nice touch, allowing windows to be defined, and thus giving each program a section of the screen to itself.

The hardware for the XK system is available in the form of a kit, or you can have it fitted to your Spectrum by TV Services of Cambridge. The company guarantees its work — if for no other reason than that fitting the mod will Sinclair Research guarantee. This should go quite some way towards calming those who get nervous at the idea of burning their guarantee bridges.

The modification takes the form of an extra board that fits inside any ZX Spectrum model, switching out the internal RAM above 32K when using an external RAM pack. The board allocates pages 127 and below to the two internal RAM pages, by using line D7 to choose between internal and external pages.

At least two pages of RAM need to be allocated to the internal memory, as the 32K RAM is actually composed of eight 64K chips. These chips have one side faulty — and permanently switched off (see *Suddenly It's The 64K Spectrum*! last issue) — giving 32K. However, it's possible (when the XK system is fitted) to examine this other half of the chip by switching to the second internal page and PEEKing what's there.

The working 32K page is selected by the Spectrum on power-up. The chosen side is normally linked by a wire strapped inside the Speccy and this has to be removed so that both sides can be selected under software control. It's possible, therefore, to effectively replace the 32K chips with ones of 64K potential, and to have two pages of RAM inside the machine, as well as the external pages.

BIG IS BEAUTIFUL

The board makes sure that on power-up the internal 32K RAM is selected, and thus the Spectrum behaves normally. It does this by use of an integrated circuit latch which is controlled by two data lines, one to decide the internal/external RAM selection (D7) and the other to control which page is selected (D0).

Using the command OUT 253,255 both of these will be switched out of the memory map. On a modified Spectrum without the modified RAM pack, this would result in the machine resetting itself back to the copyright message; in effect, it would behave like a 16K Spectrum (because there are no extra pages fitted). This happens because the Spectrum's stack is located in the topmost part of the paged memory. It's therefore important that you don't use this address in your normal programs (software companies also, please take note!). Unfortunately, for reasons best known to itself, Ultimate write to this part of memory often in games such as *Sabre Wulf*; a special loader will be available that removes all offending instructions.

The rest of the pages are allocated by the other seven bits in the number sent to I/O address 253. By fully decoding these bits, pages totalling over 4096K can be allocated to ROM or RAM. This is greater than any other personal computer in existence — even the mighty IBM!

One limiting factor in all this expansion (over 128 pages in all) is that the power supply will need beefing up and/or that the address lines and so on will require buffering. However, facilities like these are included on a number of motherboards for using one or two extra RAM packs ... they can be stuck straight into the edge connector at the back of the Spectrum.

I've had a 16K ZX81 RAM pack performing (through an adaptor board) as page 255. It contains a simple Basic pro-

gram to remind me of the time (on the top line) for my appointments, while I've been using the disassembler in the internal RAM page 126. The clock runs at about half normal speed when the extra Basic software is multi-tasking. Mine is no great example, but running two games at once, as well as printing out the results of a database, might be well worth considering. It's also possible to buffer print output via one of the pages from Basic. And just think how interesting many adventure games could be with four million bytes to play with!

UP AND RUNNING

The final software works on any machine (with or without Microdrives) using a tape-based extension to Basic. It's loaded from tape or Microdrive cartridge into the bottom 16K of memory using LOAD""CODE immediately after power-up. This allows you to use keywords for switching in and out the pages and for turning the multi-tasking on and off. Stopping the program also stops the multi-tasking; thus any errors will not effect the other program.

The area between 29K and 31K in the operating system can be used to swop data between the pages. In a simple method, you can POKE the data bytes into here from one page, and then PEEK at them from another. The software will also allow you to use the various channels to swop data between pages.

Software can be written to recognise the new system as OUT 253,0; at any time PRINT IN 253 will print a number less than 127 ... if it's not fitted the number returned will be 255. Software houses should therefore have no trouble at all building in facilities that allow their programs to use the extra RAM provided.

I WANN' IT!

By the time you read this, the XK system will have made its first appearance at the ZX Microfair (8th September) and the price to punters is £14 for the DIY Spectrum modification kit — £19 to have it fitted (both prices are inclusive of VAT and postage). The Basic extension to control the extra memory is included in the package. Using the same system, 16K Spectrums will be upgradable to a full 64K of internal memory for just £74 (also inclusive of VAT and postage).

The XK system hardware is copyright of Stephen Adams. He'd like to hear from hardware and software manufacturers interested in using it — and he'd also like to hear from users (via *Your Spectrum*) with some idea of the sort of things they'd do with such a system, and how *they* would expand it.

SPECIAL OFFER

For readers of *Your Spectrum*, Stephen Adams has worked out a special low price for the XK system. Simply fill out this coupon and make out a cheque/Postal Order for the relevant amount, and you'll get £3 off your purchase. When you've done all that, send the whole lot off to T'/ Services of Cambridge, Frenches Road, Cambridge CB4 3NP. Tel: 0223 358366.

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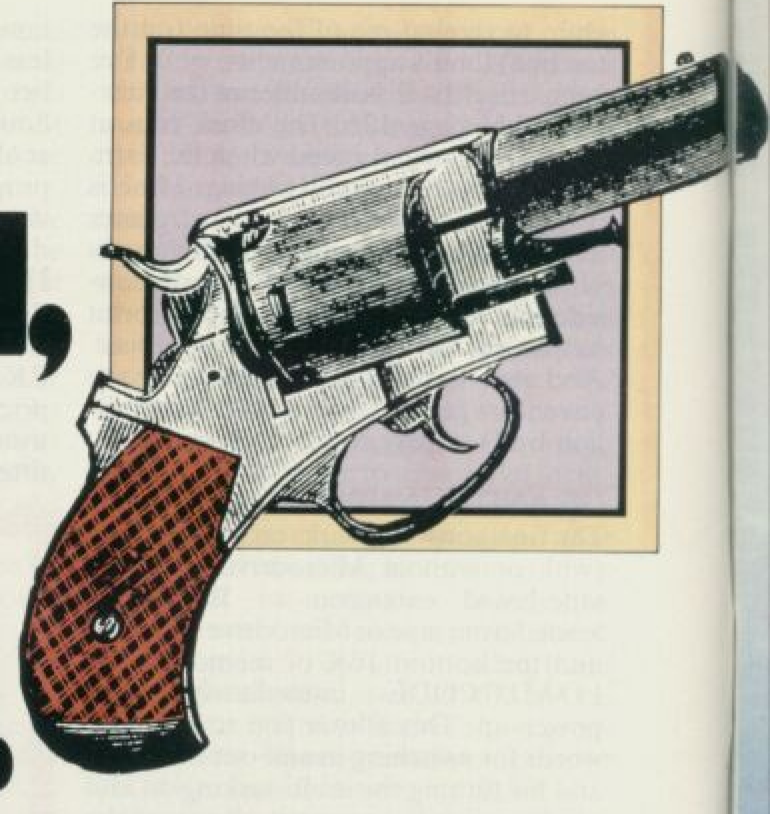
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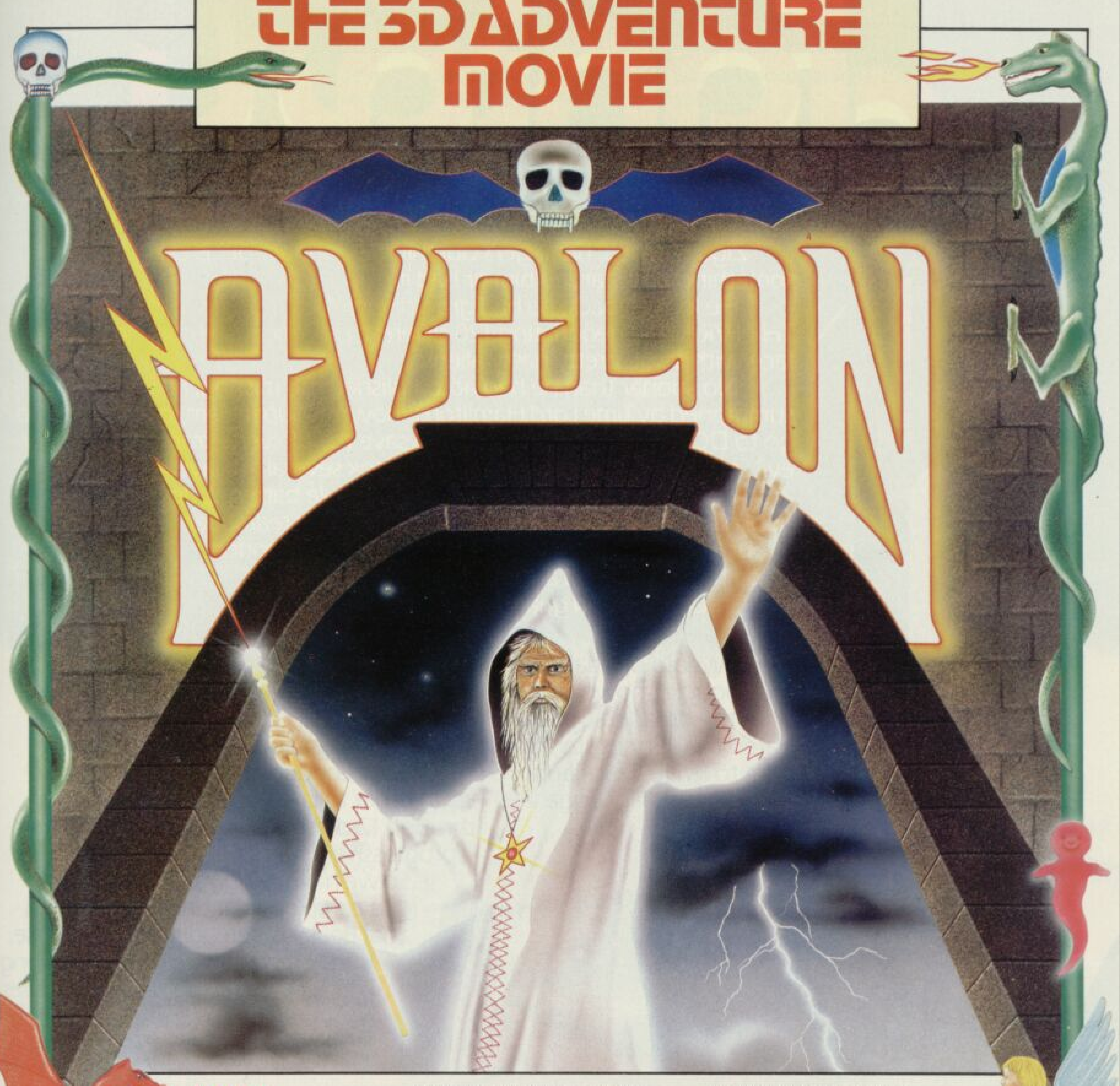
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fantasy
SOFTWARE
"Ziggy turned, his fingers clutching the trigger of his capsule gun, something had startled him or had it?
He looked back, he had grown very tired from his many exploits in THE PYRAMID negotiating 120 different chambers and coming face to face with some pretty nasty aliens.
No sooner than he had accomplished this mission, he was summoned by Time Lord Hamilton (known as Super Ham to his friends) to go to DOOMSDAY CASTLE and to save the Universe from the infinitely evil Scarthax, this being no small task took several megayears. By this time Ziggy was completely exhausted, his capsule battered, dented and wobbling as he limps in the direction of home, a real super hero of our time. Unable to leave the Universe undefended he radioed his great friend and colleague Beaky on the planet of Crackit to stand guard until his return.
Beaky would normally assume this role without a second thought, however he had his own problems to face for the dreaded Eggsnatchers had returned to threaten the very existence of his breed. Beaky's survival instincts do not allow him to leave Crackit until he has reared enough chicks to fight off the Eggsnatchers. In order to crack it, he must pass through 12 different stages each getting progressively harder.
So we have it, Ziggy returning home for a complete refit under the illusion that Beaky is defending the Universe, surely it can't take Beaky that long to secure his own species and when will Ziggy be back.....?"
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SL

Logo has only just been made available on the Spectrum. Ian Beardsmore tackles the basics of the language, exploding myths along the way...

TURTLE TURNING

The one thing that being a Speccy owner brings with it is an implicit acceptance that any piece of software developed for the home market will sooner or later be released in a version for us — always assuming that we didn't have it first. Of course, this in turn breeds a sort of paranoia should we ever actually get left out of something. Up to a point, one such 'something' has been Logo.

One of the reasons Logo has only just been made available on the Spectrum is due to the fact that Logo is a language designed for a particular function within education — and more particularly, it's shaped more to the American concept of education. If that hasn't already damned Logo for you, then perhaps I can balance the books a little. Let's take a closer look at what might have been missing from your lives.

ON THE RIGHT LINES?

The first listing I'm going to be talking about shows the most rudimentary implementation of Logo that's ever likely to be foisted upon you.

A few notes are necessary. The program asks a number of Yes/No questions, followed by pauses (the pauses are there for those with slow fingers, who might otherwise hang around too long on the keys). The start co-ordinate is PLOTted starting at line 30 — if it's not the start, simply press the 'N' key. Line 60 leads into the main 'draw' routine, and some prompts are PRINTed#1 just for fun. The real work is done in lines 2030 to 2150. The program won't consider turtle graphics or anything other than 90 degree angles; that's for you to add in your own good time.

Logo comes in two parts . . . first, the useful and reasonable instructive drawing program, and second, some dirty great gobbets of US educational psychology. These two are bound together by the visual myth of turtle graphics. Thus, people without access to Logo think that they're missing the greatest thing in the world since sliced bread. Certainly, for the Speccy owner, the idea of the turtle — with its clear affiliations to robotics — would seem the most exciting part of the whole package.

SLICING STRINGS

Having shown just how fundamentally simple Logo can be, we now need to make the routine a little more mature. The best way of doing this is by using parsing — or string slicing — to break down a series of commands; the second listing given attempts to do this.

Again, this is not the most elegant of demonstrations but it should serve its purpose; string slicing is, in fact, a large part of Logo. But, what if instead of printing pretty messages like those at line 1100, we output to a port? For example, we could define a port along the lines LET turtle = 62000, followed by OUT turtle,n. There's nothing difficult about that. The elements of the language are simple, string slicing is simple, so why all the fuss? Even the absurd screen mapping on the Speccy can be overcome in Basic by the DRAW command. Building a turtle is a project not an article, so we'll not be going too far in that direction here. However, we can take a quick look at how in theory the software can be continued.

There are two parts to a Logo command . . . turning the turtle in the direction we want it to head, and moving it the distance we want it to go in that direction. The turning and the movement can be controlled by looping the string; in the second routine, we simply printed the 'VAL 1', but this will form the basis of our loop, each pass turning or moving the turtle one step in the desired direction.

Thus, all the essentials of control could be carried out from a single byte, with a single bit assigned to each motor forward, each motor reverse, both motors forward and both reversed; that is, six bits in all. That leaves two (for example) to control pen up/down.

Without wishing for one moment to underestimate the problems of building or controlling a turtle — especially the decoding of the signals from the port — I do sometimes feel there's a bit too much mystique about it all. Yes, they're difficult but, on the other hand, they're neither magical nor impossible. In many ways, the same is true of the Logo language itself. It's a very sound aid to teaching, given the teaching facilities to use it. But it's not the universal panacea that teaches all things to all children and, to be fair, I don't think those who use it would ever regard it as such. YS

```
  10 LET x=0
  20 LET y=0
  30 PRINT AT 0,0;"First Co-ordi
nate ? Y/N          ": PAUSE 30
  40 IF INKEY$="" THEN  GO TO 40
  50 IF INKEY$="y" THEN  GO SUB
1000
  60 PRINT ;AT 0,0;"Direction an
d length ? Y/N      ": PAUSE 30
  70 IF INKEY$="" THEN  GO TO 70
  80 IF INKEY$<>"y" THEN  GO TO
100
  90 IF INKEY$="y" THEN  GO SUB
2000
 100 PRINT AT 0,0;"Finished ?  Y
/N                  ": PAUSE 30
 110 IF INKEY$="" THEN  GO TO 11
0
 120 IF NOT INKEY$="y" THEN  GO
TO 30
 130 IF INKEY$="" THEN  STOP
 190 STOP
 200
1000 REM First Co-ordinate
1050
1100 LET z$="Co-ordinate "
1110 PRINT #1;z$;"X  (down) ": P
AUSE 60: INPUT x
1130 PRINT #1;z$;"Y  (across)":
PAUSE 60
1140 INPUT y
1150 PLOT x,y
1200 RETURN
1500
2000 REM             Draw
2010
2020 PRINT #1;"Direction. (Up-u,
 Down-d, Left-l, Right-r).": PAU
SE 120
2030 INPUT d$
2040 INPUT m
2120 IF d$="l" THEN  DRAW -m,0
2130 IF d$="r" THEN  DRAW m,0
2140 IF d$="u" THEN  DRAW 0,m
2150 IF d$="d" THEN  DRAW 0,-m
2170 RETURN
```

The 'really-simple' version of Logo gives you a taster of this graphically orientated language and asks you a number of Yes/No questions followed by pauses for those with slow fingers.

```
  10 LET n=1
  20 LET d$="w"
  30 PRINT "Enter Rotation, (R)
followed by number of steps. The
n enter 'M' followed by the leng
th of movement. End with 'E'"
  40 INPUT a$
  50 IF CODE a$(n)>62 AND CODE a
$(n)<91 THEN  LET d$=a$(n)
  60 IF NOT CODE a$(n)>62 AND CO
DE a$(n)<9 THEN  GO TO 200
  70 LET p=n+1
  80 LET n=n+1
  90 IF LEN a$<n THEN  GO TO 200
0
 110 IF CODE a$(n)>47 AND CODE a
$(n)<63 THEN  GO TO 80
 120 IF CODE a$(n)<4A OR CODE a$
(n)>62 THEN  GO SUB 1000
 140 LET n=n+1
 150 GO TO 50
 200 PRINT "STOP ERROR": STOP
1000 LET l=VAL a$(p TO n-1)
1110 IF CODE d$=82 THEN  PRINT "
Rotation of ";l;" steps."
1120 IF CODE d$=69 THEN  GO TO 2
000
1130 IF NOT CODE d$=82 THEN  PRI
NT "Movement of ";l
1140 LET n=n-1
1200 RETURN
2000 PRINT "END.": STOP
```

The second version of Logo which uses string-slicing for a bit more sophistication.

NEXT ISSUE . . .

Over the past few issues, I've tackled some fairly meaty problems concerning the hardware and software of the ZX Spectrum. However, from next issue on, the flavour will change somewhat — instead of me working out what your problem *could* be, I'm going to leave it up to you to tell me and then I'll try and come up with some answers! Write to me, Ian Beardsmore, on *any* aspect of the Spectrum at *Your Spectrum, 14 Rathbone Place, London W1P 1DE*. See you next month.

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Will allow you to FORMAT a cartridge repeatedly (as recommended by SINCLAIR). You only have to enter a name and number once.

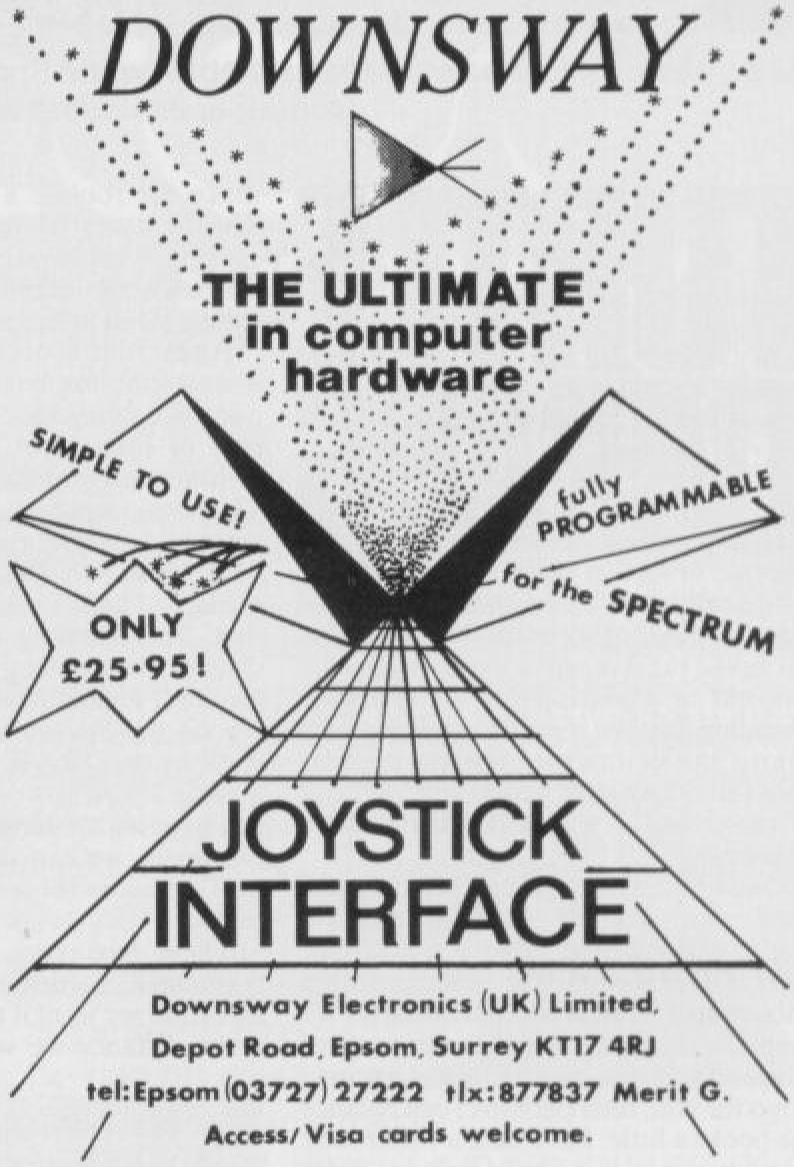
3 "Q Back"
Makes back-up copies of cartridges. One key-press will copy *all* files onto an *empty* cartridge, or you may single-step and choose whether or not to copy each file. If receiving cartridge is *not* empty, you will be asked whether or not to over-write any namesake of a file about to be copied. You can copy from many cartridges onto one until it is *full*.

4 "Q Prune"
Will delete any file with a single key-press, so *be careful* with this one!

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SEVEN STARS

Seven Stars Publishing,
Dept **S**,
15 Gloucester Avenue,
London NW1 7AU.

The catalogue of programming languages you can run on your Spectrum is growing steadily — already it includes Pascal, Logo, Prolog, and countless versions of Basic and Forth. Mr Zip himself, Simon Goodwin, *looks at an overall guide to computer languages and two texts on Pascal.*

THE LANGUAGE BARRIER

In the dark days before *YS* was born, author Garry Marshall spent some of his formative years writing for *Computing Today (Who didn't? Ed.).* His magazine series set out to explain a programming language each month — now Newnes Programming Books has given him the chance to develop that theme.

THEY'RE ALL HERE

Programming Languages For Micros is a paperback of 126 pages. It covers more or less every language which is fashionable among micro enthusiasts, although two of the most influential — 'C' and Logo — are only mentioned in passing. It starts with an excellent introduction to high-level languages. Dr Marshall neatly explains the purpose of computer languages and the costs and benefits of different approaches to the task of converting human problems into ones which a computer can solve.

The next chapter contains detailed examples of Basic and Pascal. Once again the approach is readable, although the author's academic background begins to show through.

Languages like Comal, Lisp, APL, Forth and Prolog are handled next, along with the venerable 'ancients', Fortran and Cobol. The sections on APL and Forth are perhaps the least satisfactory. The coverage of APL only mentions expressions, and gives the impression that the author is unaware of the way APL functions can be defined and grouped together in 'workspaces'. The coverage of Forth makes no mention of the useful 'compiling words' which allow programmers to re-design their system.

Graphics are handled next, with an explanation of GINO — not strictly a language at all, but a set of Fortran subroutines which allow the user to generate intricate graphics in two or three dimensions. The explanation of WSFN — a robot-control language — is fascinating, although it was irritating not to be told what the name stands for! Finally the book looks at Pilot, a simple language that's used to design 'question and answer' educational programs.

Programming Languages For Micros is a good book for anyone interested in programming for its own sake, as opposed to programming to solve specific problems. The text is quite well-written and — most important of all in a book for hobbyists — the overall tone is enthusiastic.

PASCAL IN PARTICULAR

Our next book is also from Newnes, and is written by and another *Computing Today* contributor, Mike James. I pipped him to the post with the *CT* series on Pascal, so he has retaliated with a book to join the 20 or so 'introductions to Pascal' which are already in print.

Pascal For Micros is a well-presented 170-page paperback. The publication has two main sections. The first part explains enough statements to allow simple programs to be written... and in the second, there's a discussion of more sophisticated features such as procedures, functions, and non-trivial datatypes. Each section is followed by a chapter of example programs. Towards the end of the book there's a discussion of REPEAT loops, GO TO statements, pointers and variant records — features which Mr James feels to be 'specialised'. The book ends with the obligatory syntax diagrams, a few appendices and a very brief index.

"Wouldn't it be fun if we could write a Basic program to provide the language Pascal?"

As a tutorial in Pascal programming, the book is not outstanding. Like many others, Mike James places insufficient emphasis on data storage — a crucial feature of the language. The approach is strongly 'programming first, data afterwards' which is the opposite of the sequence in which most non-trivial problems should be tackled.

The book tries to justify the word 'micros' in its title by making references to small-computer implementations of Pascal. And yet the author fails completely to mention the best-selling HiSoft Pascal. Perhaps a future edition will mention HiSoft Pascal as well, making the book more attractive to Spectrum.

Pascal For Micros is fairly typical of the low-priced Pascal books now available. It scores over the others with its relaxed, less academic style but, from the other side of the coin, suffers an occasional lack of precision and a rather uncritical approach.

DIY PASCAL

In the last text I looked at, Jeremy Ruston entreats us to *Learn Pascal On Your Basic Micro*.

The book is actually based on quite a clever idea. Most people become interested in Pascal when they realise (or imagine) the limitations of the Basic interpreter built into their computer. Wouldn't it be fun, therefore, if we could write a Basic program to provide the language Pascal? It might also be cheaper than buying a full-blown Pascal compiler. The last 80 pages of this book consist of dot-matrix printouts of a 'Pascal compiler' for the Spectrum, BBC Micro or any standard 'Microsoft Basic' computer. You type your Pascal program into DATA statements and run the Basic to compile them.

The compiler translates a limited subset of the Pascal language into very simple Basic; consequently, the 'compiled' code runs at a very slow speed. It's printed up on the screen as it's generated, and (on the Spectrum) you have to copy it down and type it into the computer later, to test it. This makes it completely useless for serious programming, and its design for a range of computers means that it works very slowly indeed. The compiler is quite well-designed but it uses large amounts of subroutine calls and string handling, which the Spectrum handles at its usual torpid pace.

The first 10 chapters of the book make up yet another course on Pascal programming. I'm sorry to say that some of the assertions are downright wrong, especially early in the book; the discussion of data-structuring completely ignores pointers, records, files, and sets. Also, in my humble opinion, Mr Ruston is a better programmer then he is a writer. But, if you're interested in the way a language compiler could be written in Basic for a group of computers, then perhaps the book is worth buying. The program certainly makes interesting reading, and neatly handled blocks and expressions. But if you want to learn Pascal, then forget it. YS

We looked at...

Programming Languages For Micros
Garry Marshall, Newnes Technical Books
ISBN 0 408 011 858, £6.50

Pascal For Micros
Mike James, Newnes Technical Books
ISBN 0408 012 498, £6.50

Learn Pascal On Your Basic Micro
Jeremy Ruston, Interface
ISBN 0 907 573 279, £5.95

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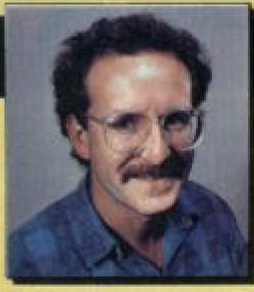


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ART FOR ART'S SAKE

There are many graphics toolkits available on the market, each claiming to give the Spectrum the commands it needs to become a 'true' artist.* Peter Freebrey *finds out if they left the drawing board too soon . . .

Many of the programs now available for the Spectrum have quite amazing title pages and graphics within the program. But, wonder not, for with a fair amount of preparation and care, you too can produce similar effects. That's where graphics toolkits come in. They appear in a number of different guises, but the main reason for our interest is that they all cut down the level of work involved in creating a picture on the screen. They fall into one of two main kinds — those that enable you to draw lines, shapes, blocks of colour and dots anywhere on the screen, and those that provide a simple way of creating your own user-defined graphics; some of these toolkits provide both within the one package.

Judging packages against one another is no easy task — because each of the better utilities offers something that the others don't. Either one has to wait for a package that includes all the facilities listed here (unlikely), or else you'll have to choose the one that offers what seems most suited to your present needs. In fact, there's a great deal to be said for having more than one toolkit; that way, with a little care, you can always SAVE from one and LOAD into another — perhaps to take advantage of a specially needed routine.

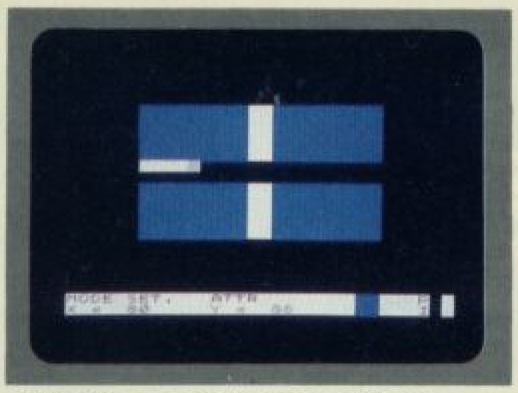
48K MELBOURNE DRAW

Melbourne House
£14.95

Although one or two graphics toolkits had appeared before this one was launched, none ever got the widespread publicity of this particular package. *Melbourne Draw* has now had well over a year to make its mark and it's gained the reputation of being a most effective utility.

LOAD it and the program will auto-RUN and display the main menu. This offers several options enabling you to LOAD previously developed pictures or user-defined graphics (UDGs), edit a picture, and also to SAVE and VERIFY.

MELBOURNE DRAW — MELBOURNE HOUSE



***Melbourne Draw* employs a unique method to add colour. The pixels and attributes are treated as separate items, so everything you draw remains in black and white until you switch into attribute mode; once in this mode, you use a larger cursor.**



Another worthy feature of *Melbourne Draw* is its ability to magnify specific areas of the screen using two different levels of magnification....essential for the detailed work required on the Quebec flag.



One corner of the flag complete and you can begin to see the creation of the flagpole. Notice the status menu at the bottom of the screen; this provides details of cursor co-ordinates, cursor mode, attribute states and so on.



Completed! The flagpole has been enhanced and the Fleur de Lys have been reproduced in the three remaining corners. Unfortunately, *Melbourne Draw* lacks a copy facility so the designs have to be redrawn each time.

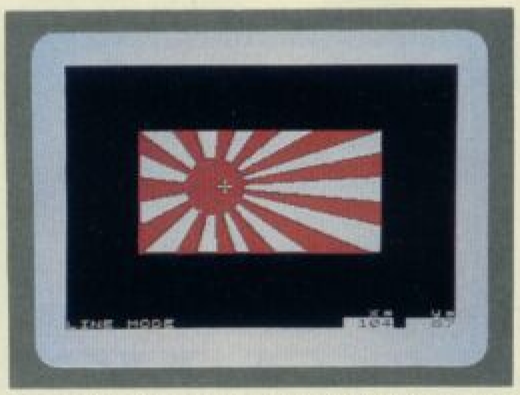
Time Taken: 45 mins. **Verdict:** I must admit *Melbourne Draw* was my favourite, it seemed the most user-friendly of all the packages. It lacks the very basic commands like 'draw' and 'circle', but this problem can be solved be doing all the groundwork on something like *Paintbox* and then moving the code over to *Melbourne Draw*. **Peter Shaw**

Select 'edit picture' and you're presented with a black screen area — plus a two-line information window at the bottom of the screen. This tells you the current 'mode' (Skip, Set, Reset, Invert, Scroll or Text); you're also told whether you are editing 'screen' or 'attributes'. Below these are two numbers representing the x and y co-ordinates of the cursor. The numbering system used is identical to that of the Basic PLOT command, even allowing access to the bottom two lines of the screen (so that the bottom left corner co-ordinates are x=0, y=−16); should you wish to use these two lines, the information window can be moved to the top of the screen. During a Fill command, the window is removed to allow complete filling of any shapes within the window area. To the right of mode and co-ordinates is a four-character block, indicating the degree of magnification you are

PAINTBOX — PRINT 'N' PLOTTER PRODUCTS



***Paintbox*'s 'radical' mode — allowing lines to be drawn from a central point to the cursor — prompted me to choose the Japanese army ensign to draw. The basic construction of the drawing was really quite easy but, as soon as I started to add colour, spurious dots appeared all over the place and I ended up with this mess!**



A considerable time later and, although it may not seem drastically different, the dots which shouldn't have been there have been removed. There's no actual 'delete' command in *Paintbox*, so the only way to take unwanted bits off is via a rather obscure use of the OVER and PLOT commands.



***Paintbox* is not solely a screen designer, it's also a character designer. Here you can see the four character sets included in the package; these can be used within your screen design, as well as SAVEd separately as UDGs for use in other programs.**

Time Taken: 1 hr 30 mins. **Verdict:** *Paintbox* on the whole is a good product, but it lacks the commands which make picture creation easy, such as 'magnify', 'copy' and independent control of the attributes. Combining *Paintbox* and *Melbourne Draw* would probably provide the best drawing program on the market. **Peter Shaw**

ART FOR ART'S SAKE

using. Finally, to the right of this is the section indicating the current INK, PAPER and attribute information.

The first step is to clear the screen . . . that way you can see what you're doing! 'Clear' options (Paper, Ink, Both, Screen, All or None) are activated by Shift (either Caps or Symbol) and the 'R' key. Generally *Melbourne Draw* is pretty user friendly, although initially, with all the commands to remember, it may seem otherwise! But even then there is help because Melbourne has thoughtfully listed all the commands and their actions on the back cover of the instruction booklet . . . yes, it's definitely user friendly.

Once you've cleared the screen you'll be left with a one-pixel flashing cursor that's roughly in the middle of the work area. This can be moved in any of eight directions using the block of keys under 'Q-W-E'. Pressing Enter will implement the Set mode and if you now move the cursor, a line will be drawn on the screen. Space activates Skip mode — no pixels set; the 'O' key lets you Reset pixels you've Set by mistake. Pressing the 'G' key puts a grid pattern over the screen, enabling you to align any shapes with attribute cells (you may wish to colour consecutive cells differently). The 'M' key magnifies your working image two times, and pressing 'M' again gives you another two-times magnification. This is particularly useful for fine detail and it's also very handy when you're designing UDGs.

Melbourne Draw has the novel facility of allowing you to convert any character square (shown by the 'grid' pattern) to a UDG (normally restricted to the Spectrum allocation of keys 'a' to 'u'). Thus, at maximum magnification you have a display of eight by five cells showing. You can create a picture on it and convert 21 cells to UDGs, either for use elsewhere in your picture or for use within other programs. You're also given the data for each, should you want to record it for future use.

The user can scroll the display in any direction and print text to any character square. The direction that the text is printed can be rotated; that means if you want a word reading down the screen with the letters on their sides, there's no awkward positioning to deal with. Just specify the direction in which text is to be written and key in your characters; UDGs can be dealt with in the same way. Finally, the display can be reversed left to right.

Side two of the cassette has several Melbourne House title pages for you to LOAD, alter and otherwise play/learn from.

PAINTBOX

PRINT 'N' PLOTTER PRODUCTS
£9.95

LOAD *Paintbox* and it'll autoRUN to display the main menu. This serves up a choice of three options: UDG Editor, Precision Plotter and Screen Planner.

Opt for UDG Editor and you're given a further menu which allows you to view existing UDGs, create new UDGs (using *Paintbox*'s Drawing Board) or to go to Sketch Pad. Other options allow for LOAD or SAVE of UDGs from/to tape, the final one being to return to the main menu.

Option 1 — View UDG Banks — displays four sets of UDGs already in memory; you can choose one of these for use with further options. The four banks are (a) a submarine, (b) a warship, (c) aircraft and (d) buildings, trees and vehicles. Also displayed are any UDGs you've already created using option 2 — Drawing Board. This gives you an eight by eight box within which to create your own UDG characters; you can call from one of the banks of UDGs, or you can call a keyboard character and alter that. Designs can be drawn using either the cursor keys or a Kempston Joystick. Once you've opted to call a character to create or alter, there's no return . . . you must then create something, even if it's only a space; there's no way you can break out of this part of the program.

Having produced your character, you're then given the opportunity of creating an inverse copy, a mirror image — or even of rotating it through 90 degree steps; whatever it is, just file the result in the bank of UDGs you're working with. There are four banks of 21 UDGs, so it's possible to create a total of 84 different graphic designs; the instructions tell you all you need to know about using banks of UDGs within your own Basic programs.

The Sketch Pad option gives you a six by 30 cell (work area) together with a display of existing UDGs. Here you can try various combinations of UDGs (out of any bank of 21) to see what they look like; if you're planning to use several linked together, make sure they're in the same bank!

The next selection from main menu is the Precision Plotter. You're given the choice of keyboard cursor keys or, again, the Kempston Joystick, and from there you can either start from a blank screen or LOAD a previous file from tape. First choose INK and PAPER colours — then the decision is yours whether to create a new picture, or return to one held in memory. The cursor keys give movement in four directions. Key 'Q' PLOTs a single pixel point and 'W' DRAWs a line from the end of a previous line or pixel point plotted; key 'E' will Erase the last command and 'F' will Fill with the current INK colour. Fill often misses out portions of the screen so you may have to recall it to fill in the 'holes'. *Paintbox* also supports Circle ('H') and Arc ('A'). INK colour can be changed at any time but PAPER has to be chosen at the time you

CAMPBELL SYSTEMS-DRAWMASTER



***Drawmaster* was a very difficult program to use. It had all sorts of mega-amazing features, but most of them seemed pretty pointless to me. For example, there's a command called 'Hop' which allows you to draw dotted lines, and pressing the 'U' key changes all the INK to black, and all the PAPER to 'dull' white. Wowee!**



Adding colour is not as easy as it may at first seem. *Drawmaster* has no special features to handle the attributes (colour) alone — they have to be stuck on when you alter the display file. It makes design work difficult if you always have to bear in mind the effect of colour at the same time as creating the shapes themselves.



The finished flag — messy maybe, but I was getting more and more frustrated with a program that was getting very awkward to manipulate. If you're reading this out in Korea, please don't send in letters of complaint about the state of your flag — I did my best!

Time Taken: 2 hrs. **Verdict:** *Drawmaster* was almost painful to use, and I can't recommend it for the construction of accurate pictures. The program would have been greatly improved if all the flashy commands were removed and replaced with a 'magnify' facility and maybe a *Melbourne Draw*-type attribute control. **Peter Shaw**

ART FOR ART'S SAKE

first enter Precision Plotter. Over ('N') can be useful for correcting minor mistakes and there's a choice of cursor size — cross hairs for general use and a much smaller, single pixel, for precision work. Shift plus cursor keys moves the cursor at a much slower rate — again for fine, careful positioning.

As on *Melbourne Draw*, the bottom two lines are used as an information window, showing the mode and x/y co-ordinates of the cursor. Here, however, the bottom two lines are not accessible. Should you return to the main menu and then back again to Precision Plotter, key '9' restores the current graphics screen to the display. This is stored in permanent memory, while the program is held in RAM. A COPY of the screen can be printed out on a ZX Printer and the display SAVEd to tape for LOADing later.

Final option served up by the main menu is Screen Planner. This gives you the screen display created with Precision Plotter, together with the ability to call from any of the banks of UDGs. These are displayed on the screen with x and y co-ordinates (now for row and column) and INK and PAPER are available at any time; you can experiment with different attributes, although there doesn't appear to be any option to alter BRIGHT and FLASH at this point. Return to Precision Plotter (via the main menu) and you've now got your composite display to work on.

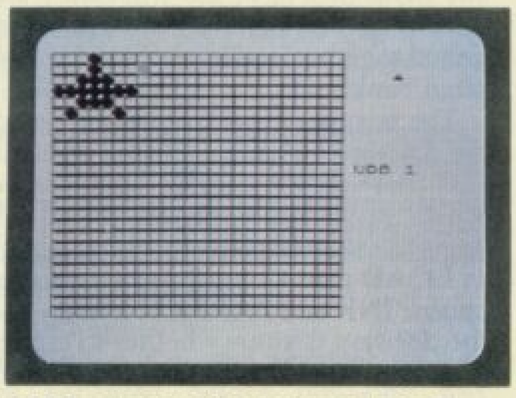
The instruction booklet gives details of how to call on these SAVEd screens from various memory locations within your own programs. Remember, though, that each screen SAVEd under these conditions uses 6912 bytes. Print 'n' Plotter has a program — *Screen Machine* — that can save bytes on graphics screens; we'll be looking at that in a future issue.

DRAWMASTER

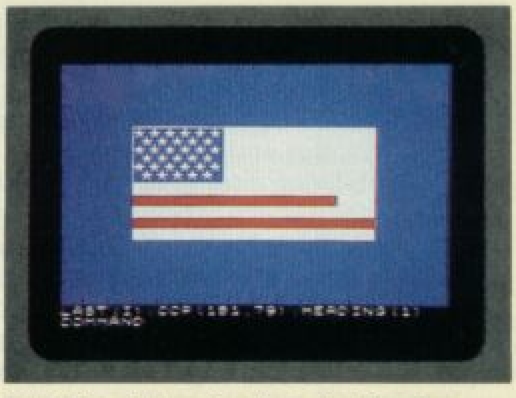
CAMPBELL SYSTEMS
£6.95

Campbell Systems is probably better known for its database and filing programs, but *Drawmaster* certainly offers a host of features. The program autoRUNs on LOADing to display a blank work screen with a two-line information win-

CAD — DREAM SOFTWARE



***CAD* had most of the features I would expect to see in a decent package, with the exception of 'magnify'; you can play around on a large grid and then move your work onto the main screen, but once moved you can't then remove any mistakes that may have crept in. The screen shot here shows a user-defined block (UDB) of the star in the US flag; once defined, a UDB can be copied onto the screen as many times as required.**



On to the picture itself, and notice the liberal sprinkling of UDBs in the top left-hand corner of the flag. The easiest way I found of adding stripes to the flag was to fill the area in white INK and then paint in red INK over the desired parts. I couldn't get the right number of stripes or stars exactly but, with time and careful planning, it's possible.



I was really pleased with the end result — certainly a lot better than I thought the program deserved. The final flag may not be completely kosher, but the program proved too difficult to use with any accuracy in the time I'd allotted. The main problem with *CAD* was the cursor (spelt 'Kursor') commands. The process was slower than it could have been the cursor had to be redrawn every second.

Time Taken: 1 hr 45 mins. **Verdict:** *CAD* was not one of the better programs from the selection I looked at. It was also the only package mostly written in Basic — and it showed. **Peter Shaw**

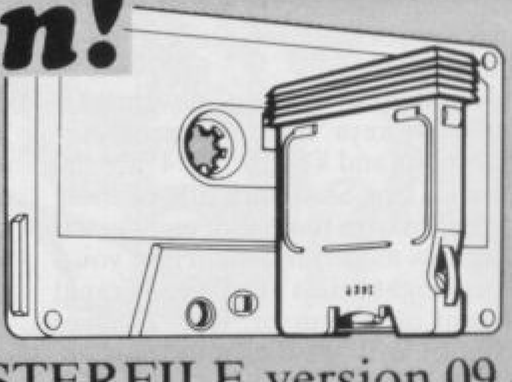
campbell systems — for spectrum 48k

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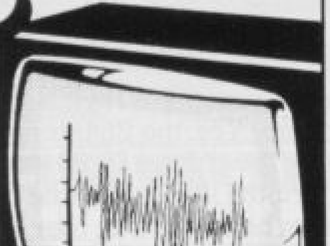
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dow at the bottom (showing the current mode of the 'pen': Trans(parent), Draw, Erase or Over and the current attributes: BRIGHT, PAPER and INK (FLASH is not included — as is fairly obvious from the display). The x and y pixel co-ordinates are indicated in normal Spectrum fashion — that's 0,0 in the bottom left corner — and there's no way of using the bottom two lines of the display (which, of course, is the information window). Also shown are the current Line and Column (standard character cells) and pressing the 'Q' key gives what's called 'Menu' — in fact, a guide to which keys do what (a useful system of quick reference, and you can't lose it!).

The direction of the 'pen' movement is controlled by keys '1' to '8', normal cursor directions and keys '1' to '4' are the diagonals. Caps Shift with one of these cursor keys moves the cursor eight pixels (in the Draw mode this would give you a dot every eight pixels) and allows rapid movement of the cursor. Key 'Z' gives fine control, with the cursor moving one pixel at a time (accompanied by a beep) and with the x and y co-ordinates being updated continuously. Other movement modes update the co-ordinates only when you stop.

Drawmaster has several interesting features. You can define a particular point called 'X' (marks the spot — geddit?) on the screen and Draw lines or Arcs to it from any cursor position. You can draw from the cursor in any of the eight specified directions and they'll continue on until hitting another pixel — or, alternatively, the edge of the screen.

The Window commands are also useful. They'll let you define a rectangular window, store this for future use, recall it, paint it with current PAPER colour, or re-define its position on the screen. *Drawmaster* can also Rescale any image and draw it elsewhere on the screen, either larger or smaller. In fact, the program's quick reference guide was obtained by copying normal Spectrum text and reducing it to 75 per cent of normal size. It's a time-consuming process, but one that greatly enhances the scope of the toolkit. To reduce or enlarge a portion of the screen — create a window around it, then use the Clear Window command to quickly erase the original once it's been copied.

Text can be placed on the screen, but while in 'text' mode remember not to overwrite line 22 — the screen will scroll! Circles can be drawn at a specified radius about the cursor and, of course, there's the usual Fill command. The program allows screens to be SAVEd or LOADed to or from tape, but there are no user-defined graphics facilities available.

COMPUTER AIDED DESIGNER

DREAM SOFTWARE
£5.95

Despite the 35-page booklet that accompanies *CAD*, there seems a notable lack of index or reference material to guide you swiftly through the functions and commands. To start with, it takes some searching just to discover (a) what it will do, and (b) how you do it. As usual, the program autoRUNs on LOADing at the same time showing the 'command' screen. The information window at the bottom displays the last command you gave, the current cursor position and the heading — the latter is selectable from a range of one to 16, and it defines the direction in which a line will be drawn . . .N, NNE, NE, ENE, E, and so on. For some unspecified reason, East is Heading 1, North is 13, South is 5 — not the most obvious of choices. To change direction, key 'H' and the word 'HEADING' will appear in the information window. Now press Enter to confirm that a change is in order, then key in the new number, followed by Enter; all rather long-winded and time-consuming.

Most commands require a similar procedure. Jotter will plot (set) a pixel and here the cursor keys are used to guide your 'plot' (Shift *plus* keys '5' to '8'). However, to step over a pixel you have to key 'E' to end Jotter, press the 'K' key to enable cursor movement, move the cursor, and then key 'E' to end this command . . .ouch! The cursor provided is a very small square, consisting of one clear pixel at its centre. One might reasonably expect the clear pixel to represent the vital position from whence all can be drawn. Wrong! It's at the top left-hand corner!!

CAD supports a number of useful design shapes: Cube, Circle, Facet (parallelogram), Rectangle, Square, Triangle and 3D Box. There's also an option to define the position of 26 ('A' to 'Z') points on the display of all or specific points, drawing lines between two or more points, shifting the cursor to a specified point and nominating 'automatic points' (where, for example, the corners of a subsequently drawn cube are automatically specified). If you reset (clear) all previous points — remember to 'display' points twice (first displays, then un-displays!) or you'll be left with unwanted letters all over the place.

In addition to the design shapes provided above, there are routines that (a) allow the design of a shape from the display to be stored for future use and (b) UDBs (user-defined blocks), blocks of four character cells that can be created and used within your display. Both options can be SAVEd to tape — but only used thereafter with *CAD*. The second option, UDBs, provides a 24 by 24 grid on which to create your design. Cursor keys move the spot cursor and the Space key either 'sets' or 'resets' a cell . . . and continues to 'set'/'reset' cells to the right; this happens quickly and it's not particularly easy to act on one specified cell. Quick fingers and care are called for. But, a word of warning . . . a return to the main display screen ensures that all previous work is lost; remember to SAVE it first.

Text can be placed on the screen and a Fill option fills a shape with the current INK colour. Erase removes the last command you made and Grid will display a 16-pixel grid pattern around the *edge* of the display area.

Overall, *CAD* is an interesting program that's obviously been developed with specialist design work in mind; it's not a general purpose graphics toolkit. YS

TLL TORNADO LOW LEVEL

***YS* announces the last call for flight *TLL*. Your captains are Ross Holman and Dave Nicholls. We hope you have a smooth flight...**

Imagine you're in a swing-wing fighter bomber on a training mission to seek out and destroy enemy targets around an air base. That's right, if you've ever fancied being a Tornado pilot, now's your chance to start training.

The aim of *Tornado Low Level* (*TLL*) is to swoop in low over the 'enemy targets' (seen to you as ground markers) and destroy them. Sounds pretty easy, eh? But think again, because your eyes and hands have to work overtime making sure you're on target, at the right height, and that you're not going to hit any of the many hazardous objects which have an annoying habit of getting in your way.

FLIGHT OF FANCY

TLL doesn't go for the in-flight realism of *Fighter Pilot*, but rather it's a cross between an arcade game and a simulation. Whichever category it falls into there's no denying that it's graphically superb. Author Costa Panayi has carried on developing the graphic techniques he used in *Android 2*; now, with new heights of perfection, you'll find the area of land over which you fly is simulated in incredible detail.

An isometric perspective is used to depict the scenery — the player seeing only a part at any one time. We look down on a landscape of trees, buildings and cliffs which plunge into large areas of water ... and the plane is superimposed over them. Clever use of colour — normal and bright — gives the buildings, walls and cliffs a feeling of width, depth and height. The view below scrolls continuously as you fly, wrapping around in all directions; cursor control has been used, presumably to alleviate attribute corruption problems and maintain speed.

And there's more, for not only can your plane bank in either direction, but it can also climb and dive. You don't so much fly over the landscape as through it. The best visual clue to your height is the shadow of your plane on the ground — which behaves very realistically, climbing walls and passing over roofs as you jet over them.

TLL is a slickly-presented piece of software; it's both nicely packaged and offers reasonable instruction options from loading. One minor irritation is that it only caters for keyboard and Interface 2 control, and violently objects to Kempstons and some other peripherals. Vortex reminds everyone to remove these, not on the cassette sleeve but (rather irritatingly) by interrupting loading and sticking up a suitable message.

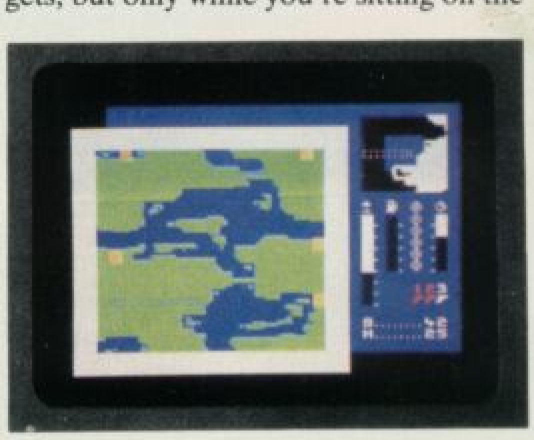
CHOCKS AWAY

The instructions are brief and to the point — you're given your mission and a rundown of the instruments. Start the game and for a few seconds you'll see a complete map of the playing area, showing the runway and five flashing blocks that indicate the positions of the targets. The view cuts to the main screen where a region of 22 by 23 cursors act as your window on to the world. Offset to the right are the instruments. Top right is the radar which actually shows a larger area than you'll see through the playing window; here any targets will appear as single pixels. The area currently under surveillance is depicted by a bright square and the whole region scrolls in unison with the main map. Below the radar is an altimeter which shows height above ground level, and completing the gadgetry line-up there's a fuel guage, 'targets destroyed' counter, and current and high scores.

Controlling the plane is simple — just up, down, left and right, plus another key that doubles as a take-off and swinging wings control. The 'M' key can be used to re-examine the map showing your targets, but only while you're sitting on the



Confusing at first, after a few hours in the air you'll soon get the hang of the guages on the right of the screen.

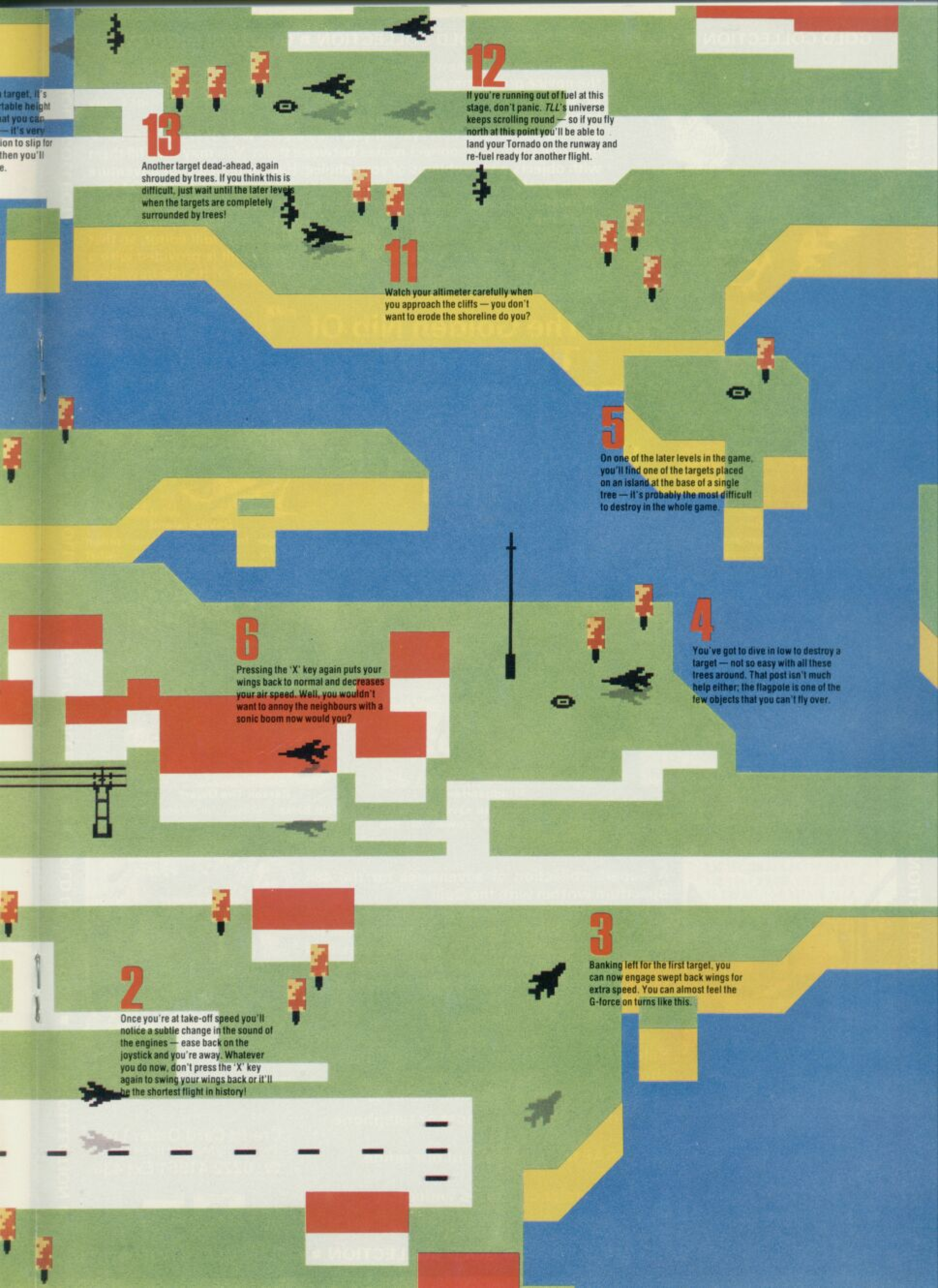


When you start each level of the game, you'll be presented with a full-size map, showing the positions of the five targets you must destroy. Be quick though, it's only on-screen for a few short seconds!

TLL AIRSPACE

The map of TLL is in fact square, so we've squashed it up a little to fit our page. Isometric perspective has been used to give an impression of the scenery. You look down on a landscape of trees, buildings and cliffs which plunge into areas of water. The view below you scrolls continuously as you fly, wrapping around in all directions.





…target, it's …rtable height …at you can … — it's very …ion to slip for …then you'll …e.

2

Once you're at take-off speed you'll notice a subtle change in the sound of the engines — ease back on the joystick and you're away. Whatever you do now, don't press the 'X' key again to swing your wings back or it'll be the shortest flight in history!

3

Banking left for the first target, you can now engage swept back wings for extra speed. You can almost feel the G-force on turns like this.

4

You've got to dive in low to destroy a target — not so easy with all these trees around. That post isn't much help either; the flagpole is one of the few objects that you can't fly over.

5

On one of the later levels in the game, you'll find one of the targets placed on an island at the base of a single tree — it's probably the most difficult to destroy in the whole game.

6

Pressing the 'X' key again puts your wings back to normal and decreases your air speed. Well, you wouldn't want to annoy the neighbours with a sonic boom now would you?

11

Watch your altimeter carefully when you approach the cliffs — you don't want to erode the shoreline do you?

12

If you're running out of fuel at this stage, don't panic. *TLL*'s universe keeps scrolling round — so if you fly north at this point you'll be able to land your Tornado on the runway and re-fuel ready for another flight.

13

Another target dead-ahead, again shrouded by trees. If you think this is difficult, just wait until the later levels when the targets are completely surrounded by trees!

GOLD COLLECTION ■ GOLD COLLECTION ■ GOLD COLLECTION ■ GOLD COLLECTION ■

The Quill

48K Spectrum



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From The Golden Nib Of The Quill Comes a Gourmet Feast for Hungry Adventurers Volume 1 of the GOLD COLLECTION



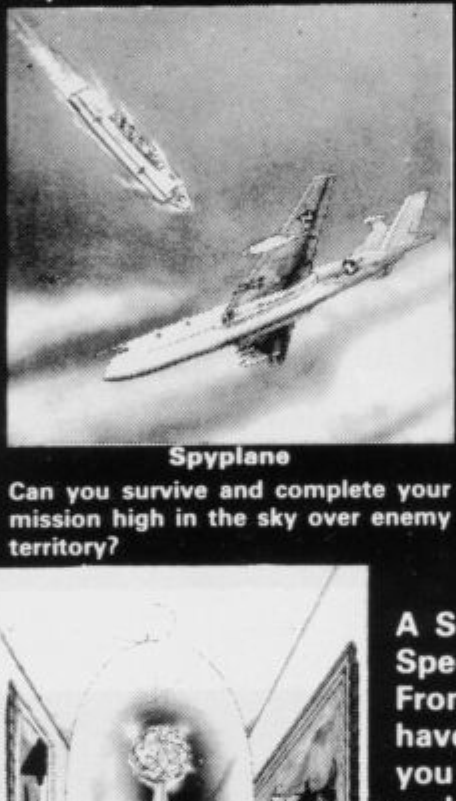
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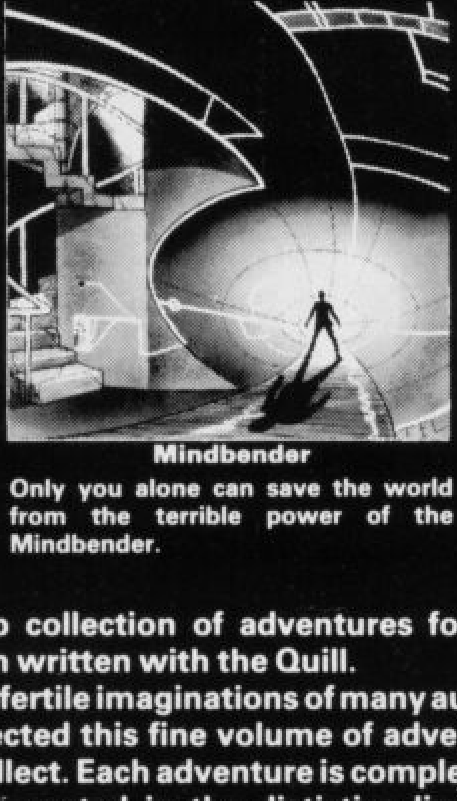
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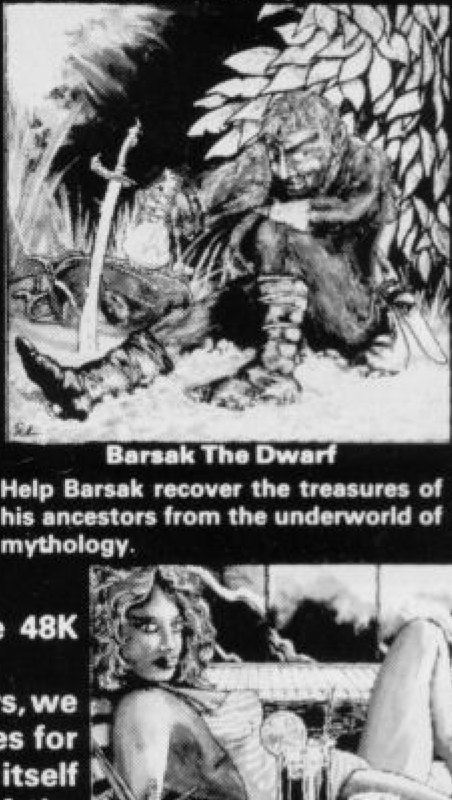
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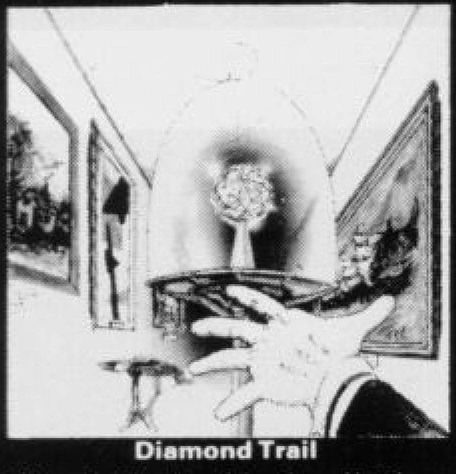
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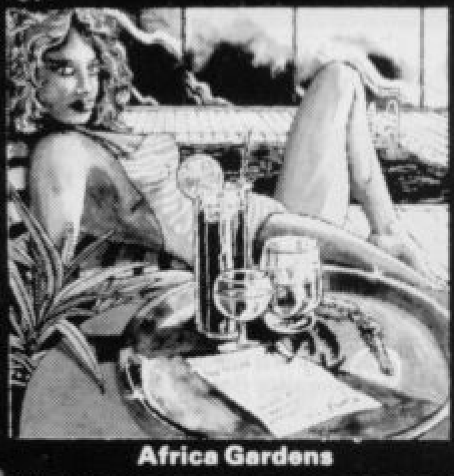
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TLL TORNADO LOW LEVEL

runway. Pressing a swing-wing key and 'P' together will abort the current game.

To begin with your plane sits at the end of the runway waiting for take-off. Power on and, as it starts to accelerate down the runway, you'll hear the roar of the engines (simulated by a fairly standard beep) which changes in pitch to indicate that you've reached take-off speed and it's time to leave terra firma. Once in the air, you'll delight in your new-found freedom — climbing, banking and diving; in fact, the plane will only line up on 45 degree bearings, though it animates through 16 phases in rotating through 360 degrees. The keyboard response is very good, allowing the fighter to turn in comically tight circles; it may not be realistic, but it's necessary if you want to avoid the obstacles. Pixel by pixel height adjustment allows you to skim at zero feet above the ground — if you dare!

For a while, I was quite happy to just get a feel for the controls and learn how to judge the height of buildings; then I got a bit more adventurous and swung the wings back. This makes things move much more quickly and, although the plane is just as manoeuvrable, your fuel tank runs dry in what seems like no time.

The sensation of flying in three dimensions is even more incredible and the shadow thrown by your plane dramatically adds to the visual impact. This really is a very clever piece of programming — disappearing behind buildings, breaking up over trees and dropping down to appear on the water surface as you go over cliffs.

WHAT GOES UP ...

Once you've marvelled at all these wonderful effects and discovered (the hard way) the height at which you can skim the rooftops or dive under the power cables, it's time to try a mission proper. Here's how my first sortie went.

Having first mentally noted the positions of most of the targets I set off down the runway — tally ho! Pulling back on the stick, I took off, made a sharp bank right over the pylons and saw an enemy target at one o'clock. I needed some practise at swooping in low, circling and lining up on target ... finally, I got it right, and my great achievement was marked by an appropriate explosive sound effect. You really do have to be low to destroy them, and the lower you get the more points you score. The targets on level one stay in much the same place each time and gradually I discovered the best way of approaching each of them.

If you begin to run short of fuel — or can't find one of the targets — then you'll need to land; you automatically get refuelled and, of course, you can use 'M' to look at the map again. Landing is tricky and requires some practise. Rule one is never try and land (or take off for that matter) with the wings swept back or you'll crash for sure. Secondly, line your shadow up with the centre of the runway; because of the wrap-around effect, you'll re-appear before in the starting position if you carry on. Don't forget though that precious time is ticking away — so don't hang about, you've got five targets to destroy before you can return to base successfully.

As you get more proficient and progress to new levels, the targets are laid in more difficult positions — near trees or even on the water (which demands some rapid manipulation of the controls). By level four it starts to get really tough, and route planning is necessary if you're to get anywhere near the target. In one instance, you have to fly low over a large lake, zoom under a bridge, bank sharp left between the coast and a small island — and there, at close hand, is the objective. For later levels, targets are placed under pylons, closer to trees and houses, and even in narrow channels between cliffs; for some reason, it all gets easier after level eight or nine. Last thing, beware the objects that you can't fly over ... a tower and some tall thin poles are strategically placed to catch the unwary.

TLL not only shows that British software leads the world in quality and innovation, it's also a salutory lesson on just what can be done on the not-so-humble Spectrum. YS

HACKER'S GUIDE

Dave Nicholls, *software champ, hacks into TLL and comes up with some interesting observations*

The standard way of describing games that use 3D effects is to say that they have 'perspective' graphics. But, in fact, there are three basic types of perspective: vector (*Battlezone*), vanishing point (*Zzoom*), and isometric (*TLL, Android 2*), and each of these poses its own problems, for programmer and hacker alike.

The first difficulty to be overcome is the fact that the game's author has had to pack a lot of information into a relatively small amount of memory, and working out what's going on turned out to be nothing but a mighty headache. In *TLL* the data is stored in a large array, with one byte stored for each character position; a character position in this case is one screen character wide and one 'deep' (that is 'into' the screen). This byte contains information giving the height, colour and pixel pattern that will eventually end up on the screen. The map is 160 by 140 characters and thus it takes up almost 22K of memory space.

Of course, the main reason for using 3D graphics is to provide a greater sense of reality in the games; to this end *TLL* allows your plane not only to fly over the landscape but behind it as well! It does this in the usual way whereby the objects furthest away from the players' viewpoint are drawn first — so that the closer objects can overwrite them if necessary. Thus, if your fighter is flying behind a building, the plane will be drawn first and the building printed over it. There is, of course, an exception to this rule — the plane's shadow — which has to be handled by a special and more complicated algorithm.

There's one thing about the program that had annoyed me from the first time I loaded it — the fact that it uses interrupts to produce the continuous sound (all of which, incidentally, is produced using the same Beeper routine in ROM that Basic uses). This is the reason why the program crashes when certain peripheral devices are connected (in my case, the Kempston joystick interface).

Having found the usual 'infinite lives' POKE and an 'infinite time' POKE, I discovered a Kempston decoding routine already embedded and evidence that the option menu at the beginning has been changed! It seems that Vortex had to patch the code at the last minute, presumably because the company only tested it using an Interface 2 or the keyboard up until the final stages. This is a pity because it takes only fairly minor changes to allow the Kempston to be used properly, even with interrupts. I say 'properly' because I managed to convert my version by switching off the interrupts and calling the sound routine explicitly so that I could use my joystick (see accompanying listing); the only side-effect of this is a degradation in sound quality, because the sound routine is not being called as often.

TLL is an excellent program, its only real failing (and one that it shares with many others, for example *Jet Set Willy*) being a dearth of proper testing early on in its production. Please, please, software producers, take the time to play/test your games properly; nothing hits sales harder than frustrated users.

Finally, before you ask, the disassembler I used was an excellent offering, soon to be published by Cameron Else of *Jet Set Willy* bug fixing fame. Watch out for it! And in answer to the second obvious question ... to use a Kempston Joystick you must first MERGE in the Basic loader and then edit the following lines. Remember there's some degradation in sound quality when using this method but 'you pays yer money and you takes yer choice!'

```
20 DATA 55,62,255,221,33,0,64,17,
156,191,205,86,5,33,179,255,17,
198,118,1,3,0,237,176,33,182,255,
17,210,132,1,5,0,237,176,201,0,
0,0,205,105,254,24,63
50 FOR n=65423 TO 65466
.
.
.
3000 RANDOMIZE USR 65423
```

To get infinite lives and time, MERGE the program and stop the tape when you get the OK message. Now LIST the Basic loader and edit lines 20, 50 and 3000 to match the lines shown below. Now type RUN and start the tape from where you left off.

```
20 DATA 55,62,255,221,33,0,64,17,
156,191,205,86,5,62,0,50,190,136,
50,15,132,201
50 FOR n=65423 TO 65444
.
.
.
3000 RANDOMIZE USR 65423
```


RACE
MOVI SOFT 2

MEGABASIC

Announcing ... the ultimate software sensation — Mike Leaman's MegaBasic — a completely new concept in Spectrum programming. Discover the delights of QL-style windows, sprites galore, stunning sound effects, single letter entry, named procedures ... and much, much more!!

YS MegaBasic is a machine code program which dramatically enhances the capabilities of the 48K Spectrum. Mike Leaman's long-time labour of love leaves the user with about 22K of usable memory, while at the same time providing the kind of features you'd expect to find on a computer five times the price — windows, different character sizes and fonts, procedures, as well as stack of new commands. Not only that, the program was written specifically to iron out the Speccy horror number one . . . the non-standard keyword entry system.

Overall, *YS MegaBasic* is a unique way of upgrading the Spectrum — and one which doesn't involve paying out huge sums of money for expensive pieces of hardware. Fancy a trip to new worlds of Spectrum versatility? Then read on!

KEYBOARD MAGIC

Just take a look at the way the keyboard operates under *YS MegaBasic*. The keys now work as they would on a 'normal' computer, that is they only give single ASCII characters; now, all commands and functions have to be typed in letter by letter. This will allow the *YS MegaBasic* owner to use all the new commands easily and, of course, any user new to the Spectrum will no longer have to convert to Sinclair Research's idiosyncratic keyword system.

In the land of *YS MegaBasic*, the Space key is used as a new Shift key and that's how you squeeze all the new functions out of the keyboard. Just one single key stroke, for example, will RUN the current program in memory or LOAD and RUN the next program on tape!

Lo and behold, the Spectrum is now provided with user-defined keys. The top row (keys '1' to '0') can be programmed to produce a string of up to 255 characters. What's more, the usual 'hack' method of editing on the Speccy has been replaced by a slick sequence that's more reminiscent of the BBC Micro. The method used involves the use of a second cursor which can be moved around the screen independently of the usual input cursor. Text can be copied from the second cursor to the input cursor by just a single keystroke.

The standard Spectrum screen divides up into two parts . . . *YS MegaBasic* employs three! There's a section for inputting commands and displaying error messages, another for program output, and finally an area for automatic listings. The size and position of these screen areas are completely user-definable, and the same area can even by used for two (or all three) functions.

SCREEN DREAMS

YS MegaBasic has done amazing things to the Spectrum's screen output facilities. Now, it offers no less than three different sizes of character:

1. 64 columns by 24 lines Here, even though the width of each character is halved, the characters still remain quite clear — even on a standard TV set. This size of character is ideal for applications like wordprocessing.

2. 32 columns by 24 lines This is the normal size used by the standard Spectrum.

3. 32 columns by 12 lines Now you can

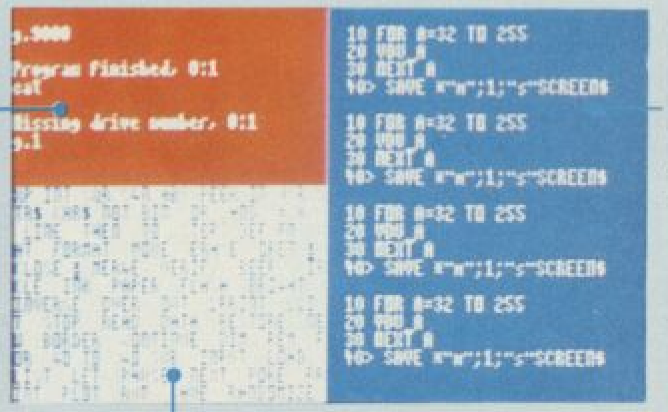
WINDOW DEMO PROGRAM

```
  5 BORDER 0:INK 9
 10 DISPLAY_3,64,18,0,0," DOUBLE HEIGHT ";
 20 DISPLAY_2,32,8,0,16," NORMAL SIZE   ";
 30 DISPLAY_1,32,8,32,16,"  64 COLUMNS   ";
 40 GO TO 40
 50 @DISPLAY_M:XS:YS:X:Y:A$
 60 WINDOW_Y,X,YS,XS
 70 MODE_M:FONT_0
 80 FOR A=0 TO 7:IF A=4 THEN FONT_1
 90 PAPER A
100 PRINT A$;
110 NEXT A
120 RETURN
```

- Line 5: Sets up the initial colours.
- Lines 10–30: The procedures used to define the text in each of the three windows — each procedure calls line 50 to define the 'display' subroutine.
- Line 40: Stops the screen being corrupted by the 'OK' message.
- Line 50: Defines the 'disolay' subroutine.
- Line 60: Sets the position and dimension of each window.
- Line 70: Selects the required character size and the standard character set.
- Lines 80–110: Print the text up on the screen in different colours (pretty standard Basic this!).
- Line 120: Returns from the subroutine.

WINDOW DEMO

The input part of the screen — whatever you type comes up in this window. It's also the area used for editing; to edit a line, you simply type EDIT 10, for example, and the line will be printed up so that you can edit it BBC micro-style.



Once you've typed in a section of program, if you press the Enter key again the program lines will be LISTed to this area of the screen.

When you type RUN (or execute a direct command) the program's output will be displayed in this window.

The screen format for the input/output of *YS MegaBasic*. Note that, although the screen layout is set originally for three windows carrying out the tasks illustrated above, under software control the window's size and purpose can be changed.

produce characters which are twice the normal height.

And another bonus . . . when you're using options 2 and 3, it's also possible to select between two different character sets; in effect, this gives you five different ways of displaying characters on the Spectrum screen.

Ever thought you'd have a QL-like windowing system on the Speccy? Well, courtesy of *YS MegaBasic*, there's now a way of keeping the display confined to a particular area of the screen. The size and location of windows is totally user-definable, and different character sizes can also be mixed within the same window. The user can even switch between several different windows at any time; in fact, the total number of active windows is only really limited by the amount of memory available. Each window can be cleared or inverted individually, and scrolled up, down, left or right.

SMASH SPRITES

Now, for the first time ever, the Spectrum incorporates its own sprite routine. All

Although it might not make too much sense to you just yet, the listing on the left creates the display shown on the screen. You'll notice that, as well as producing three windows, the windows each contain multicoloured text in three character sizes: double height, normal height and that used for 64-columns. Look closely and you'll see that the double height and 'standard' size text comes in two different fonts.



you do is define the direction you want the sprite to move in and then send it on its way; once started, the sprite continues of its own accord. You can also define what happens when the sprite hits another graphic object . . . it can either stop or keep moving.

A Speccy sprite is defined by bytes in memory — just as with a user-defined graphic — and each byte represents a horizontal line of eight pixels. Each sprite can be any multiple of eight pixels wide and any number of pixels deep. In addition, each square of eight by eight pixels can have its own attribute — so sprites can be multi-coloured!

With *YS MegaBasic*, your MegaSpectrum will automatically provide you with 10 sprites — although there are ways of getting more. Remember though, the speed at which your *YS MegaBasic* program runs is dependent on the size and number of sprites that you're using. The more sprites there are, and the larger their size, the slower your program will run.

Since defining sprites is a very complicated process, a 'sprite designer' program is supplied free with every copy of *YS MegaBasic*. The program allows you first to define the sprites on the screen, and encode them into memory as bytes. You can then save these bytes as CODE which can be loaded into your own programs.

MEGA COMMANDS

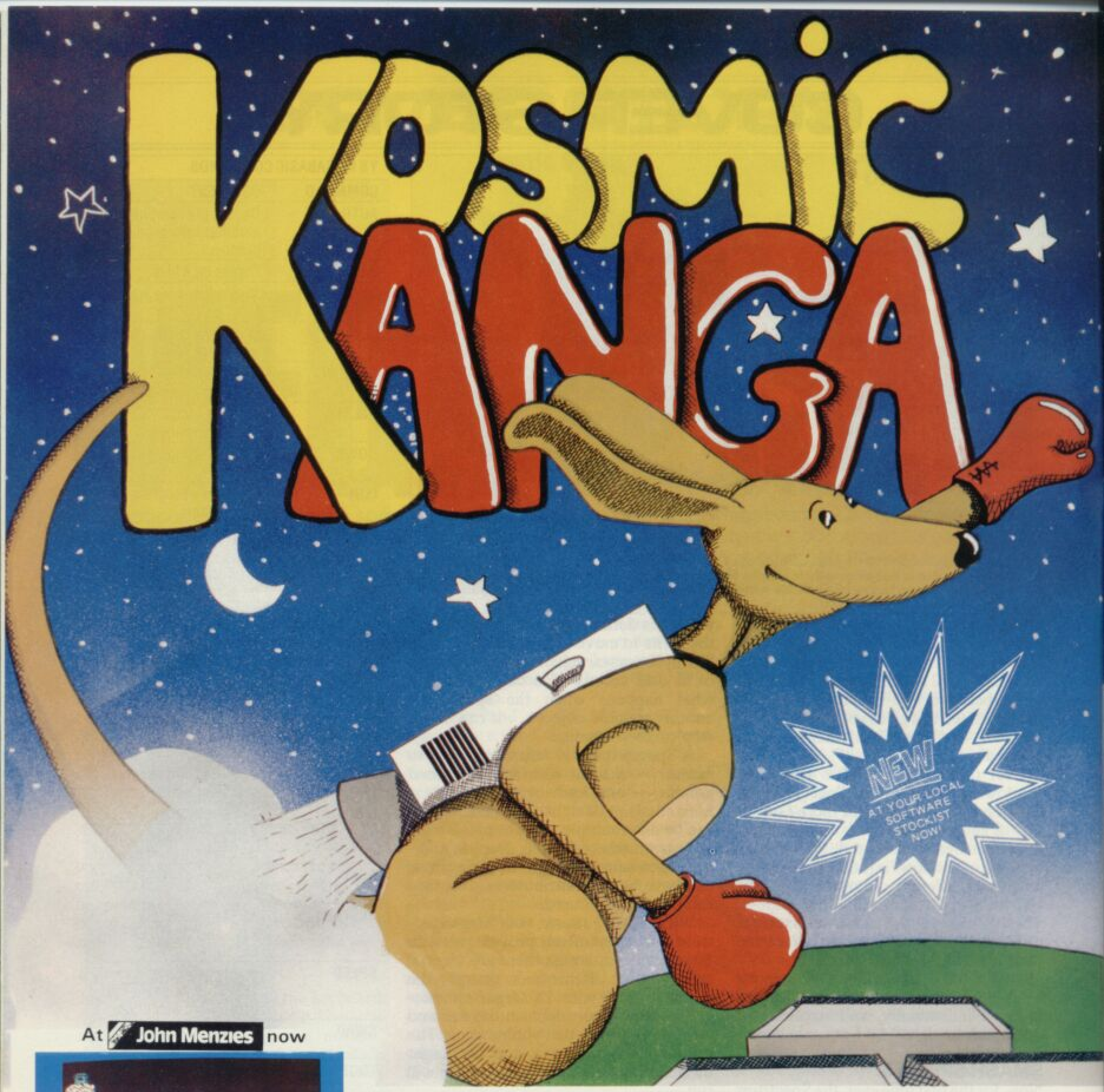
A whole bundle of new commands will fly to your fingertips — thanks to *YS MegaBasic*. For instance, there's ones to handle the windows and different character sizes — such as MODE, CURRENT, WINDOW and CLW. And commands are provided which make it easier to write programs — such as TRON, TROFF, AUTO, SPEED and DELETE. These are all entered into your MegaSpectrum just as you would

YS MEGABASIC COMMANDS

COMMAND	COMMENT
AUTO	Causes the computer to automatically produce line numbers.
BACKUP	Copies tape files.
CHANGE	Manipulates the attributes file.
CLW	Clears the current window on-screen.
CURRENT	Changes the window used for screen output.
DELETE	Erases a block of Basic *YS MegaBasic* program lines.
DOWN	Prints a string down the screen.
EDIT	Displays a program line for editing.
EXAMINE	Displays headers of tape files.
FADE	Produces special effects on-screen.
FONT	Selects the character set used for printing.
FX	Handles miscellaneous functions of *YS MegaBasic*.
INVERT	Changes INK to PAPER and vice versa.
KEY	Creates user-defined keys.
MODE	Changes the current character size.
MON	Jumps to front panel.
PAN	Scrolls a window to the left or right, pixel by pixel.
PLAY	Produces complex sound effects.
RESTART	*YS MegaBasic*'s equivalent to ON ERROR GO TO.
SPEED	Used in conjunction with TRON to reduce the speed of program execution.
SWAP	Swops one attribute for another.
TROFF	Turns 'trace' mechanism off.
TRON	Turns 'trace' mechanism on.
VDU	*YS MegaBasic*'s equivalent to PRINT CHR$.
WINDOW	Defines the size and location of the current window on-screen.

A brief explanation of the 25 new commands in *YS MegaBasic* — commands that should have been there in the first place?

enter any normal Basic command, each one being spelt out letter by letter. All commands can be entered into programs, and both new and standard commands can be mixed up together on the same line. The only difference between the two is that if a new command requires parameters, then an underline character must be placed between the



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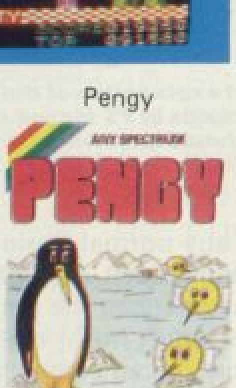
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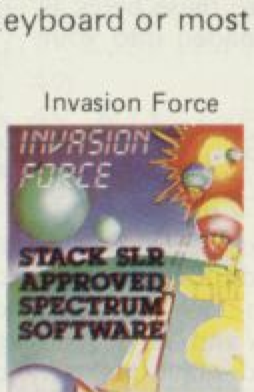
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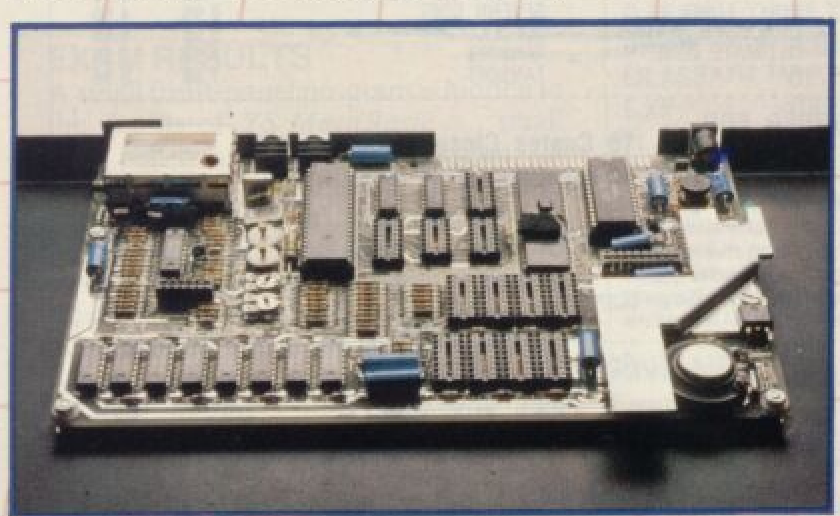
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command word and the start of the argument. For example, the command to print an 'A' character on the screen using the keyword 'VDU' would be VDU_65.

Although the existing keyboard system is non-standard and usually more of a hindrance than a help, it does actually have some advantage too. For example, when entering the command PRINT, it's quicker to stab the 'P' key than to press all five individual letters of the word. Well, the good news is that with *YS MegaBasic*, it's still possible to abbreviate some commands and functions (a list of minimum abbreviations can be seen as a separate table). You'll notice that the commands are input by way of a fullstop, but the abbreviations are expanded out to their full form when they're displayed as a screen listing. Any word not included in the table cannot be abbreviated and has to be typed out in full.

CUSTOMISING POWER

Another neat little bonus is that it's possible to customise *YS MegaBasic* to suit your own particular needs — simply by adding named subroutines. The system is similar to procedures in other Basics, except you can't use local variables. Parameters can be passed to the subroutines just as normal and a subroutine is terminated by a Basic RETURN instruction. You activate it by entering its name, together with any parameters required. The word 'Proc' is *not* required. The named subroutine really does become just like another Basic command. For example:

```
10 @CHARA_Z
20 FOR A=Z TO 255
30 VDU_A
40 NEXT A
50 RETURN
```

The program example given shows how a named subroutine is defined. You activate it by entering 'CHARA_165', which results in the characters from 165 up to 255 being displayed on-screen. Subroutines can be called from anywhere in a *YS MegaBasic* program . . . they can even call themselves. Thus, lines such as 'IF A$="TOKENS" THEN CHARA_165' are valid!

EXAM RESULTS

A small front-panel program is hidden in the depths of *YS MegaBasic* . . . small and self-contained, and written in machine code (of course). It allows us to examine the internal workings of the Mega Spectrum, enabling the user to examine and alter memory and registers, execute machine code programs, set break-points, and move and fill blocks of memory. The program works with hexadecimal numbers only and you can activate it at any time by just pressing the Space bar and the 'F' key together. It can also be activated from within a program, by execution of the command MON.

FEATURES OF MEGABASIC

ZX BASIC SPECIFICATIONS

NUMBER OF COMMANDS
~~50~~ 75
— We've added all the commands Sinclair Research left on the drawing board!

AMOUNT OF USER RAM AVAILABLE
~~41K~~ 22K
— You've less room in memory to play with — but look what you've got instead! Anyway, when was the last time you wrote a 22K program?

MAXIMUM NUMBER OF SCREEN COLUMNS
~~32~~ 64
— ...essential if you're into wordprocessing or you want to get down to business on the Spectrum.

NUMBER OF CHARACTER SIZES
~~1~~ 3
— Now you've got double-height, standard size and half-width characters.

NUMBER OF CHARACTER SETS
~~1~~ 2
— If you've envied the BBC Micro's character set, all you need is *YS MegaBasic*.

NUMBER OF WINDOWS
~~N/A~~ 6
— You can get six windows comfortably on-screen — even more if you've room left in memory.

NUMBER OF SPRITES
~~N/A~~ 10
— Again, memory is the limiting factor, but with skillful programming you should be able to squeeze a few more on-screen.

SOUND
The BEEP command + more
— As well as BEEP, you can also string together single channel pure notes and play around with white noise.

KEYBOARD ENTRY SYSTEM
~~Keyword entry through a double shift system~~ Now standard
— The keyboard now acts as a 'proper' typewriter — there are no keywords, all must be spelled out. (Abbreviations are, *of course*, accepted!)

LANGUAGE EXTENSION
~~N/A~~ YES
— Defining procedures are permitted allowing the language to be extended in *YS MegaBasic*.

YS MEGABASIC COMMAND ABBREVIATIONS

A.TTR	GO S.UB	PE.EK
BE.EP	G.O TO	PL.OT
B.IN	I.NKEYS	P.OINT
BO.RDER	INP.UT	PR.INT
BR.IGHT	INV.ERSE	RA.NDOMIZE
CH.R$	L.EN	RE.AD
CI.RCLE	LI.NE	RES.TORE
CLE.AR	LL.IST	RET.URN
CL.OSE#	LP.RINT	R.ND
C.ODE	LO.AD	SA.VE
CON.TINUE	ME.RGE	S.CREEN$
DA.TA	M.OVE	ST.R$
D.EF FN	NE.XT	T.AB
DR.AW	N.OT	TH.EN
ER.ASE	OP.EN#	U.SR
E.XP	OV.ER	V.AL$
FL.ASH	PA.PER	VE.RIFY
F.ORMAT	PAU.SE	

Introducing 'proper' keyboard entry on the Spectrum, *YS MegaBasic* may at first seem to slow things down somewhat. To combat this, *YS MegaBasic* allows 53 commands to be entered in a 'shorthand' format.

AND NEXT?

From next issue on, author Mike Leaman will be presenting a series of tutorials to help you along with *YS MegaBasic* — the software key to a new dimension of Spectrum computing. DON'T MISS IT!! YS

YOU CANNOT BE SERIOUS . . .

**64-COLUMN TEXT?
THREE CHARACTER SIZES?
QL-STYLE WINDOWS?
TWO CHARACTER FONTS?
SPRITES GALORE?
SINGLE LETTER ENTRY?
NAMED PROCEDURES?**

. . . ON A SPECTRUM!!??

Yes, it's all possible — once you've upgraded to a MegaSpectrum! Next month, you'll discover just how to lay your hands on your own copy of *YS MegaBasic* . . . the inexpensive miracle on cassette. If you want to transform your Spectrum beyond your wildest dreams, hang on to this copy of *YS* (especially the *YS MegaBasic* token) and all will be revealed next month. See you there!

SPECTRUM CONTROL

PROJECT THREE REVISITED

Pouncing on the postbags, Penny Page reports back on your solutions to Project 3. Some of you may have come up with the correct answers . . . but hands up those who understood it!

From the response we've had to Project 3, it seems that our 'bugged-up' fill routine caused more than a few problems for anyone who attempted to correct it. And while a number of brave people managed to get the thing to work, no one fully understood why.

By far the most common approach was to have a quick look at the listing, spot that RND (the random number function) was used on no less than three occasions, and realise that this couldn't possibly be right in a routine with a very precise and quite specific function. From there it was only a short step to replacing these with test values, noting the results of a RUN and amending them accordingly — a successful mixture of trial and error and educated guesswork. To clear up any misunderstanding, we'll be having a good look at the program — to fully discover the operation of each subroutine. Before that, though, a more general explanation is needed.

THE GRAND SCHEME

This particular routine is designed to fill a previously drawn shape, starting from the centre and filling in one quarter at a time. For example, the first shape in our program is a circle and the routine begins by drawing a vertical line from the centre to the circumference. When this has been completed, the y co-ordinate is reset and the x co-ordinate incremented by one. Then another vertical line is drawn to the right of the first one, and this process continues until the edge of the shape is reached (see the illustration).

But this has only filled in the first (top right-hand) quarter of the circle. Moving on to the next section (bottom right) we need the value of the y co-ordinate to decrease; similar alterations are required for every one of the four quarters. The actual piece of code for checking that we're still within the shapes' boundaries, and then filling it in, is enclosed in two small FOR . . . NEXT loops. The first (or outer loop) controls the x-axis (horizontal), while the second (or inner loop) controls the y-axis (vertical). This allows one vertical line to be completed first, before the horizontal position is either increased or decreased (depending upon which half of the shape is being filled). When the circle has been completed, the program RETURNs to draw the second shape, and so on.

Draw a circle.

```
  10 REM Filling it in
  20 LET x=100
  30 LET y=100
  40 CIRCLE 100,100,20: INK 1: GO SUB 90
00
```

Draw a square.

```
  50 LET x=150
  60 LET y=150
  70 PLOT 140,140: DRAW 20,0: DRAW 0,20:
 DRAW -20,0: DRAW 0,-20
  80 INK 2: GO SUB 9000
```

Draw a triangle.

```
  90 LET x=150: LET y=50
 100 PLOT 130,52: DRAW 40,0: DRAW -20,-4
0: DRAW -20,40
 110 INK 3: GO SUB 9000: STOP
```

Set up the variables for the first quarter.

```
8999 REM Main subroutine
9000 LET s=255: LET st=1: LET i=0
9010 LET h=175: LET he=1: LET n=0
9020 GO SUB 9500
```

Set up the variables for the second quarter.

```
9030 LET h=0
9040 LET he=-1: LET n=1
9050 GO SUB 9500
```

Set up the variables for the third quarter.

```
9060 LET s=0: LET st=-1: LET i=-1
9070 LET h=175: LET he=1: LET n=0
9080 GO SUB 9500
```

Set up the variables for the final quarter.

```
9090 LET h=0
9100 LET he=-1: LET n=1
9110 GO SUB 9500
```

Return STOP

```
9120 RETURN
```

Check for a boundary; if no boundary, plot another point.

```
9500 FOR a=x+i TO s STEP st
9510 FOR g=y-n TO h STEP he
9520 IF POINT (a,g)=1 THEN  GO TO 9550
9530 PLOT a,g
9540 NEXT g
9550 IF POINT (a+st,y+he)=1 THEN  RETURN
9560 NEXT a
9570 RETURN
```

SUBROUTINES AT WORK

Our first subroutine initialises two variables, x and y, with the co-ordinates of the centre of the circle for use in the two FOR statements at lines 9500 and 9510; then it goes on to draw this circle. Incidentally, it isn't necessary to use absolute values for the first two operands of the CIRCLE command . . . x and y will suffice.

That done, the INK colour is set to one, and control is given to the main routine at line 9000. This line initialises the variable 's' with the screen width (in pixels), the horizontal increment value 'st' to one, and the direction control variable 'i' to zero — all of which is needed to control the horizontal movement when filling in the first quarter. Line 9010 is much the same, but deals with the vertical control, where 'h' is the height of the screen (also in pixels), 'he' — this was the first error — the vertical increment value, and 'n' the direction control variable. In fact, 'he' should contain the value one; the reason for this will be explained shortly. Anyway, now that the variables for both the x- and y-axis have been taken care of, control is passed to line 9500.

This chunk of code is the core of our program, and is responsible for checking to see whether we have reached the boundary — and plotting another point if not. Line 9500 sets up the horizontal loop, and line 9510 the vertical. As both direction variables have a zero value, the result (using the two expressions) gives positive movement on both axes:

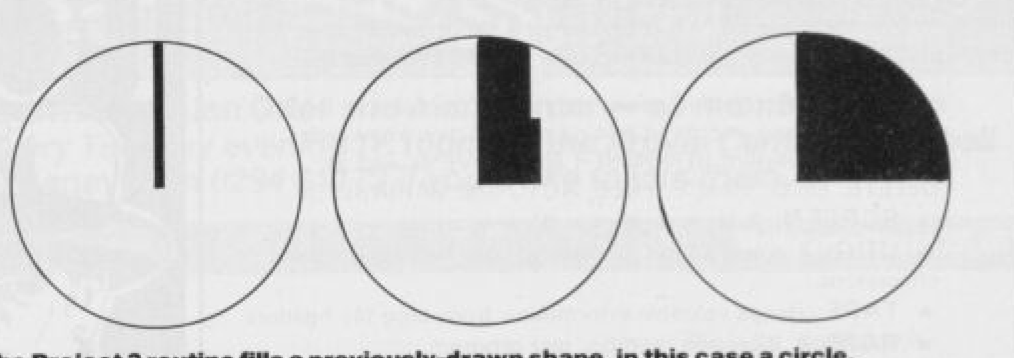
x=100	a=100+0
y=100	a=100
i=0	g=100+0
n=0	g=100

This changes, of course, as the separate subroutines that deal with each quarter are executed. After the completion of each loop, both 'a' and 'g' are incremented by one, and execution continues. However, we need to keep checking to see if we are still within the circle, and this is achieved using the POINT command. In our program, the value '1' is returned if the location specified by 'a,g' is set to the INK colour. And as the only way we can

encounter a pixel set to the INK colour is by reaching the circumference of the circle (or, in later quarters, by coming up against a previously filled-in section), we are prevented from 'breaking-out' by line 9520 which gives control to line 9550. Now we can check the next horizontal starting position by adding 'st' (value equal to one) to 'a', and 'he' (value equal to one) to 'y'. If this is not set, the quarter isn't filled, and control goes back to line 9500.

Now, having completed the first quarter, control is RETURNed to line 9030 where the variables are changed in order to direct the program to fill in the bottom right-hand section. This process continues until the whole shape is a solid mass of colour, at which point control is passed to line 50, and the whole procedure begins again with the drawing of a square. Finally, after all three shapes have been drawn and filled in, line 9570 sends us

CO-ORDINATE	DIRECTION CONTROL VARIABLES	POSITIVE OR NEGATIVE STEP	QUARTER BEING DRAWN
(x) (y)	i=0 n=0	1 1	Top right
(x) (y)	i=0 n=1	1 -1	Bottom right
(x) (y)	i=-1 n=1	-1 1	Top left
(x) (y)	i=-1 n=-1	-1 -1	Bottom left



The Project 3 routine fills a previously-drawn shape, in this case a circle, completing it a quarter at a time. It starts by drawing a vertical line from the centre to the circumference, the y co-ordinate is reset and the x co-ordinate is incremented by one. This process is repeated until the edge of the shape is reached.

back to line 9120, which in turn sends us back to the last statement in line 110 — STOP.

Included here is a table containing the variables (and their values) used to control the filling in of each quarter. By substituting these values in lines 9500 and 9510, you'll be able to convince yourself of their effect.

THE FEEDBACK

Well, as you've probably realised by now, there were just the three mistakes, all of which were concerned with the insertion of random values in lines 9010, 9040 and 9060. The corrected lines should read as follows:

```
9010 LET h=175: LET he=1: LET n=0
9040 LET he=-1: LET n=1
9060 LET s=0: LET st=-1: LET i=-1
```

Three people who spotted the problem and made only three changes are **Stephen Jones** of Pershore, Worcestershire, **Phil Ross** of Balby, Doncaster and **GG Thomas** of Geaston, Ulverton, Cumbria — well done. Another reader who got it sorted out is **Alan Dykes** from London, NW1; for some reason, however, he decided to change the x co-ordinate for the square. It doesn't really matter ... it's just rather unnecessary.

Don Hayes from Poole in Dorset also managed to work it out, but felt he couldn't stop there. He added coding to allow the starting co-ordinates to be changed at will, and also the INK colour. As this wasn't part of the problem, *YS* would like to give him its 'Slapped Wrist of the Month' award for making us read through the reams of paper which formed his solution.

PROFESSOR BRAINSTAWM'S KRAZY KROSSWORDS

Hold onto your hats — Brainstawm's back, and this time with a real doozy of a crossword to appeal to the more erudite of our reading clientele (*Our what? Ed.*). Go on, prove the Prof wrong — because he reckons that *you* have less idea how to do a crossword than cliff Barnes has of running an oil company!

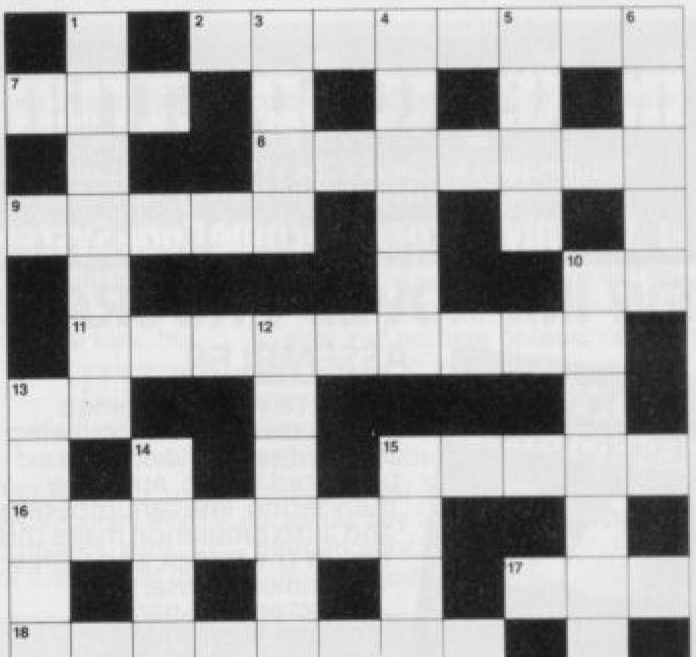
There's a prize of five new software releases for the first correct entry. Good Luck!

ACROSS

2 A knight for YS. (8)
7 Fly through the code maybe? (3)
8 Tasword could cope with these. (7)
9 Shop, to keep your database maybe? (5)
10 End of a flowchart. (2)
11 Connection with a chip. (9)
13 Starts off quite light. (2)
15 Computer's connection with BT. (5)
16 You do this over programs, often! (7)
17 Stephen Adams might know her. (3)
18 Found somewhere over the rainbow. (8)

DOWN

1 Shorten the end of a stray dog. (7)
2 Man, half-way to Ireland. (4)
4 Take out the power lead. (3,3)
5 Chop off the X or Y bits. (4)
6 Prepare to start again. (5)
10 Clear space for code. (7)
12 Listen around and sign up. (6)
13 Ships parking spaces, under your fingers? (5)
14 Prod your memory. (4)
15 Subroutine selector. (4)



Name ______________________

Address ______________________

____

Postcode ______________________

Send kompleted krossword and koupon to: Prof Brainstawm's Krazy Krossword no. 1, Your Spectrum, 14 Rathbone Place, London W1P 1DE.
Closing date for entries, 31st August 1984.

JOYSTICK JURY

On the jury this month are* Alex Entwhistle, Alan Grier *and* Alan Hunter *— all members of the Saltcoats Computer Club. Meeting every Tuesday evening (7.10pm) at the Argyle Centre, Campbell Avenue. Contact* Daniel Canavin *on 0294 61173 if you'd like to join them.

★ YS HIT ✶ MUGSY ✶

Melbourne House/£6.95

As the 'Godfather' to a gang of mafia men, your job is to keep them all happy by making lots of money and buying arms to fight off rival gangs. You've also got to pay for police co-operation and buy 'customers' who are in need of your brand of protection.

Alex: As you might expect from Melbourne House, the graphics are exceptionally well defined; the detail is superb, right down to the cigarette smoke. There are several varying screens, each making good use of contrasting colours, and the overall display is very clear and pleasing to the eye. Added to this is the very fast response time which allows the game to proceed as quickly as the player wants it to, and the Charleston that's played in the introduction.

Alan G: The idea of interacting with a comic strip is excellent, and if you become too successful, a rival gang sends out a hit-man; the café shoot-out that results is superb arcade sequence. Most of the game, however, is about entering how much money you want to spend on guns, bribes, customers and so on. There's also a wonderful micro movie at the end of each year's business. Superbly detailed graphics, excellent animation and choice of colours.

Alan H: The drawing of the graphics is incredibly fast; in fact, they appear almost instantaneously which is all the more impressive considering their very high quality. Equally astounding is the logic behind the game. It's consistent, but doesn't produce outcomes that are in the least predictable — every game seems to be quite different from the last. Even the title screen is very good. This game is well worth the money at £6.95.



Your right-hand man tells you here what is happening with your hoods in the gangland underworld and lets you know how much money you're making or losing.

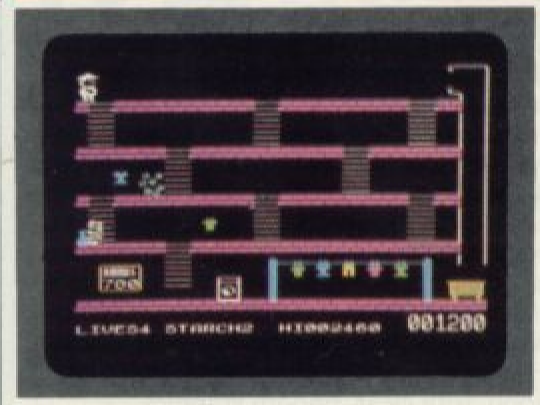
This is the 'input speech bubble' where you type in your requests, commands and replies

The status report line gives you a running report on the number of hoods you have, your 'customers' and the amount of money you have left.

The graphics used in Mugsy are great and have been drawn using Melbourne Draw; they really are very detailed.

MR WONG'S LOOPY LAUNDRY

Artic/£6.95



Mr Wong is being chased by a clothes iron, a stack of dirty washing and even soap suds, as he tries to collect the laundry. So it's up to you to help him out by spraying his pursuers with starch to stun them.

Alex: The graphics aren't very impressive and the colour doesn't improve the situation. Being so slow makes the game far too easy to play, especially when you're using a joystick, so it's worth remembering to play this one via the keyboard. Collecting laundry is an original idea, but it doesn't prove to be exciting. **MISS**

Alan H: Originality is low — it's similar to burgertime type games — but this doesn't make the game any less playable or addictive. It includes above average, well-drawn and fairly smooth graphics, with only the merest amount of flicker. But the colour could be better, as the whole display is rather dull. Another minus is the speed — it's quite slow for this type of game, but using the keyboard instead of a joystick solves the problem to some extent. **HIT**

Alan H: There's a tendency to call this game boring, but that's only because the speed is so slow and perhaps because of the way colour is used; it's the same on every screen, which means everything looks the same. However, the graphics are well defined. It would be better to have total control of Mr Wong; for example if you press the key to go left he'll continue until another key is pressed. **HIT**

SPOOF

Runesoft/£5.95

Fed up with his mundane existence and his nagging wife (Dro Ning), not to mention his whinging kids (Mo Ning and Complay Ning), Yaw Ning decides to leave them and look for adventure down at the local (The Drink Ing?). There he hears tell that Spoof the Magic Dragon has returned...

Alex: The adventure's not much like the description, but you wouldn't expect it to be. The aim is to find a component for the doctor's machine. Response to your commands is excellent, with almost immediate replies. But the best part about this adventure is the humour, which makes a pleasant change from the usual seriousness. **HIT**

Alan G: Adventures aren't usually very funny, but this one is and it tends to make it stand out from the rest. What's more, you don't have to wait ages for a reply. However, text-only adventures aren't new, and they only have limited appeal. Even this one, with its humour, will only be interesting for a short time. The text is white on a blue background and there's absolutely no sound at all. **MISS**

Alan H: The idea is quite basic, but the content is much better than lots of the other adventures, especially the humour which helps to maintain your interest. This all goes to make one of the most playable adventures around, and there are various screen prompts to help you on your way.



The fact that there's no sound, rather than detracting from the game, tends to make it even better. **HIT**

SPACE COMMAND

Virgin Games/£5.95



Encounter alien life-forms, whose orders are to seek and destroy, as you guide and protect the asteroid and its doomed city through many star systems. The city is protected by a two-stage forcefield which only actually protects the populated areas.

Alex: Virgin's still living in the past with unoriginal space games — although this one's a little better than some of the earlier offerings and the action is fast and furious. Colours contrast well, and the resulting display is quite clear. Mastering the game isn't too easy, so it stays mildly addictive. Using a joystick improves playability quite a bit. **HIT**

Alan: The graphics are a strong point. They're flicker free, highly detailed and move very smoothly. There's also a radar dish which goes through six frames of animation to revolve through 360 degrees. It's by no means a dull looking game; everything is very bright, with multi-coloured aliens and a psychedelic base. The big problem is the lack of originality and content; the game fails to hold your attention for long. **MISS**

Alan H: Every colour imaginable seems to be included — which makes it look rather interesting, the trouble is the lack of content makes it just a multi-coloured mess. The speed is much too fast, making play virtually impossible without a joystick. The sound is made up of nothing more than a few zaps, bangs and wallops. There's no choice of skill level, but you get the option to choose which pretty space ship you use! **MISS**

DUNGEON BUILDER

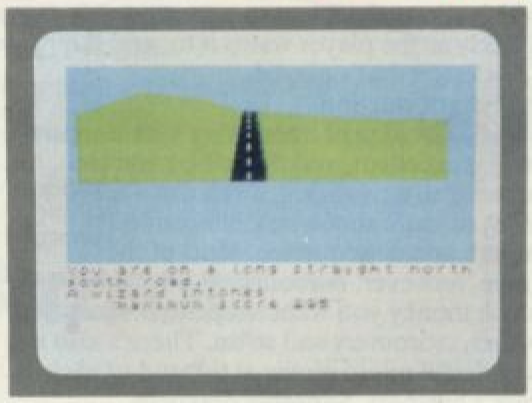
Dream Software/£9.95

This program, consisting of 15K of pure machine code, allows the user to design graphics adventures using the displayed map. There are also extensive save facilities; created programs can be run without *Dungeon Builder*.

Alex: Adventure designers are not at all original, but this one has been very highly developed and should enable adventure programs to be created that are every bit as good as the user's imagination. I, for one, will be rushing out to buy one straight away. One of the most interesting features is the way you can produce your own screen graphics, and then use any of the Spectrum's colours. **HIT**

Alan G: It's a pleasure to use, with fast response times to your commands, complete freedom in things like graphics designing and choice of colours. The most valuable feature is the way it allows a complete adventure to run without *Dungeon Builder* being present. Also very good is the 100-page manual which explains clearly how to make the most of the package. **HIT**

Alan H: A utility that actually works quite well, but could have been better. It's similar to other programs like *The Quill* and *Dungeon Master*, coupled with a crude drawing program. The graphics take a good deal of time to produce, but they're pretty good when complete. Compared with other similar offerings, this one rates



favourably, but overall appeal depends upon whether you like writing adventure programs. **MISS**

LES FLICS

PSS/£5.95



The aim is to steal the Purple Puma diamond. First though, you must collect all the objects and then experiment to find out what they do, at the same time avoiding police cars, policemen and Kaolin the Chef.

Alex: Based on the *Pink Panther* movies, this is a cops-and-robbers maze game — but one which includes some well-executed graphics. The trouble is they tend to get boring after a while. This could be due, in part, to a not particularly impressive choice of colours which cause the display to appear hazy. A better choice would have made the game a lot better. **MISS**

Alan G: It's not the sort of game to keep you glued to the screen for hours, but it does make good use of the Spectrum's graphics; it's well-drawn, and moves very smoothly. However, while choice of colours is well above average, there's lots of overlapping that takes place — mainly because the characters are quite large. There's also a really good *Pink Panther* tune between lives. **HIT**

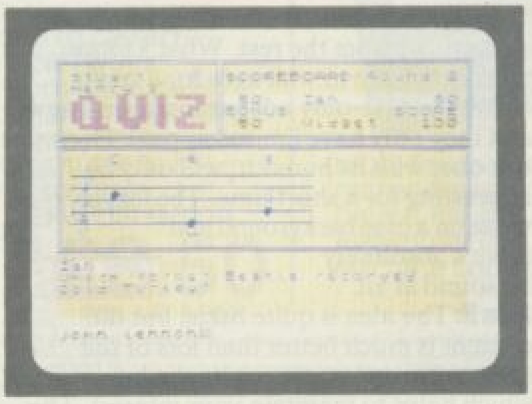
Alan H: The general idea is original, but the effect isn't. It ends up feeling like a cross between *Pacman* and an adventure — probably because the aim of the whole thing has been to give an adventure theme, while taking away a lot of the work. However, the technical execution is very good, with clear, smooth graphics, enhanced by well-chosen colours and a playing speed that's just right. **MISS**

STUART HENRY'S POP QUIZ

Bellflower Software/£5.75

Radio Luxembourg DJ, Stuart Henry, has set over 750 questions to test your knowledge of pop. The questions range from the dim and distant past to the present — so it's suitable for anyone from the oldest swinger to the youngest teeny-bopper. There's also a mystery tune to be identified.

Alex: It sounds like a pretty drab sort of program, but Bellflower has actually come up with something that can be described as good family entertainment, and not a space invader in sight — other than Boy George! The idea's very good, and there are only one or two minor problems. The first one is that the questions can't be updated and, second your answer needs to



be spelled correctly otherwise you get it wrong. **HIT**

Alan H: As you answer the questions correctly, you're given the chance to guess another note in the mystery tune (which is played at the start of a game, once only). If you guess correctly the note's displayed on the musical score, halfway down the screen. Guess them all, and the mystery's solved. The best thing about this game is that it has nothing to do with aliens, ghosts or tanks. **HIT**

Alan G: What a good idea to have a computerised pop/rock quiz for a wide range. It's appeal is only limited to contemporary music fans, which should mean that most people could get enjoyment from it. The sound is a problem and makes guessing the mystery tune difficult. **MISS**

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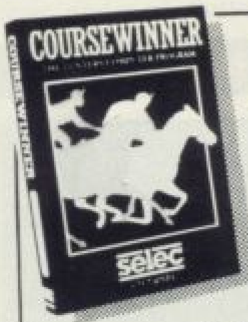
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The makers of *Turbo Chess* claim it represents a state-of-the-art chess program (it doesn't say which one) and that it includes infinite levels of play, the ability to load a previously saved program and a comprehensive analysis routine.

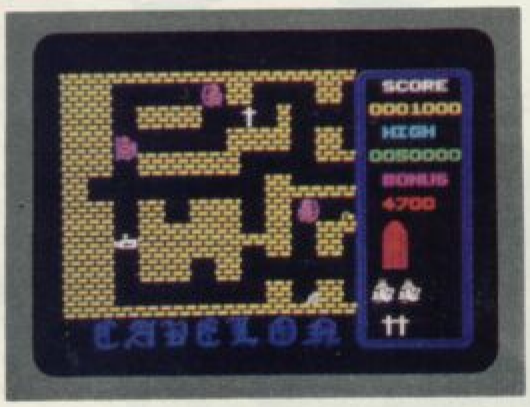
Alex: There are so many chess programs for the Spectrum that this is quite likely to get lost in the crowd. However, with features like setting the Spectrum's 'thinking', time limit, I can quite believe it is the best one around. The graphics are clear and it responds quite quickly most of the time, so at least it's above average. It's very complex, and will only appeal to chess nuts. **MISS**

Alan G: Oh no, not another chess game! Actually it's probably unfair to dismiss it out of hand, but there really are far too many similar programs on the market. This one does seem to have a few more features than the others and it's quite simple to get the hang of, although only chess freaks will welcome its arrival. It's well presented with adequate graphics and speed. **HIT**

Alan H: It's difficult to comment on a program like this without being extremely good at chess — certainly from a technical point of view it seems to be quite good. The graphics are impressive, with four-character blocks being used to define each piece and the colour has been chosen reasonably well. Sometimes though it's difficult to see a white piece in a cyan background. This example has been executed well. **HIT**

CAVELON

Ocean Software/£5.90



Inside the forbidding castle the contest has begun, and to reach the end of your quest you must successfully complete six levels of play, each time collecting all the fragments of a door which will provide your entrance to the next.

Alex: The graphics aren't all that entertaining, in fact they're downright boring after a while; a bit more thought in the design could have made all the difference. However, execution is very good, with the figures keeping their shape while moving. The idea is based on the arcade game of the same name, and to some extent has been transferred successfully on to the Spectrum. What really lets it down are those monotonous graphics. **MISS**

Alan G: The playing speed could do with being a bit faster, but the graphics are very well drawn and quite detailed. They're made even better still by the excellent use of colour; they don't dazzle too much, and overall it's a very pleasant screen display. The only thing wrong is the speed at which you fire.

Alan H: This is a direct copy of an arcade game, but there's nothing like it on the Spectrum and it's also a good replica. Technically, it can't be faulted; the graphics are clear and flicker free, the colour is bright and interesting, and there's a tune playing constantly. The speed's sometimes a bit fast which makes it difficult to play, but a joystick would improve matters considerably.

BEAKY AND THE EGG SNATCHERS

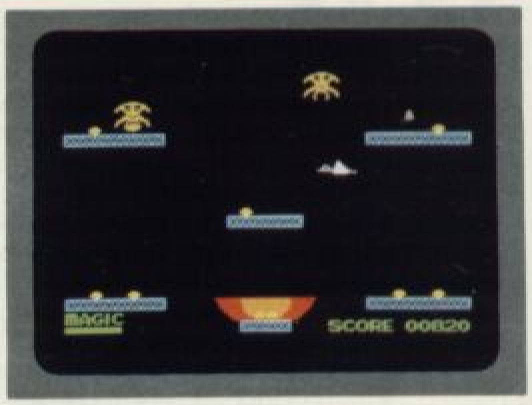
Fantasy Software/£5.50

Beaky, a member of the Andromedan Armed Condors, has chosen to lay her eggs on the planet Crackit. Unfortunately, this is the home of the egg-snatchers, so the first thing is help Beaky recover her eggs, then assist in brooding and chick rearing.

Alan G: Originality, in this case, doesn't just apply to the idea, but also to the design and movement of the graphics. They're super smooth, flicker free, and include excellent detail. In fact, it takes 120 frames of animation to move Beaky alone. Although the colours aren't the brightest possible (black background), they're easy on the eyes. **HIT**

Alex: The graphics are generally very impressive, especially Beaky (when she's in flight) and the egg-snatchers themselves. However, the use of colour could have been better — it's a bit dull to look at; a little more sound might have helped as well. Nevertheless, the originality of the idea, and the fast action, make this an extremely good game to play. The option of defining your own keys helps. **HIT**

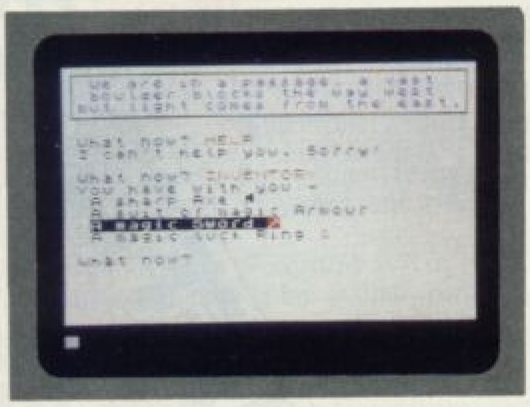
Alan H: The screen display is somehow lacking, offering little to maintain the player's concentration, which is one reason why this game is so difficult to play. Another is the speed, which is sometimes so fast that Beaky flies out of control. Still, the graphics are of a very high quality, and



are not adversely affected by the high speed. The actual idea is as good as it is novel. **MISS**

TEMPLE OF VRAN

Incentive Software/£5.50



On the eve of your execution, having been framed for murder, you're given the chance to either do or die. You're sent on a mission with an assassin bug called Edgar hanging on to your neck; he'll sink his fangs into you if you do a bunk.

Alex: This adventure is a follow up to the *Mountains of Ket*, and extends an originally good idea even further. The fact that it's text-only doesn't matter in the least, because the content is so good that it just makes you want to play on and on. However, you need to be a bit of an adventure nut and I suspect it could take a very long time indeed to succeed. Good game, very addictive, and should provide aeons of fun.

Alan G: It's full of the stuff adventures are made of, but tends to offer just a little bit more. Like having to battle against extremely vicious warts and having Edgar on your neck certainly prevents you from doing anything crafty. The actual aim is to find the Temple of Vran and destroy its evil inhabitants, a task for which you are suited — you're convicted of murder, remember? **MISS**

Alan H: It's the content of this game which makes it better than most of the other adventures and the idea of displaying your statistics at the start of the game is particularly useful when you go into battle later on. Another nice feature is the way the objects you are carrying are displayed in simple block graphics. Some adventures are better than others; this is a better one.

DARTZ

Automata/£5.00



It's darts night down at the local — Automata style — which means that not only do skill and luck play their part, but also the usual overweight and drunken slobs. Being one of these familiar specimens, you have to beware of getting too pi... drinking too much beer!

Alex: The cassette insert claims that animated cartoon graphics are included, but that's being pretty presumptuous as the only time they're present is when the player goes to retrieve his darts; even then they only occupy a quarter of the screen. Overall it's generally quite a good idea, with the usual Automata novelty value, but the content and execution leave a lot to be desired. Another fault is the claimed skill factor; your efforts hardly relate to your final score. **MISS**

Alan G: Use of graphics is well above average, especially the animated figure of the player throwing his darts. These are improved by the choice of colours which is just about right for a game of 'arrows' in the pub. There's also some very good sound included, but it gets boring after a while.

Alan H: This computerised mixture of darts playing and getting drunk at the same time is a superb idea, and very funny into the bargain. Like most Automata games it relies heavily on novelty value. Nevertheless, it does feature a well laid-out screen, adequate speed and some interesting graphics. Best of all, though, is the humour, which pokes fun at beer-bellied darts players.

CLEVER CLOGS STARTRUCKER

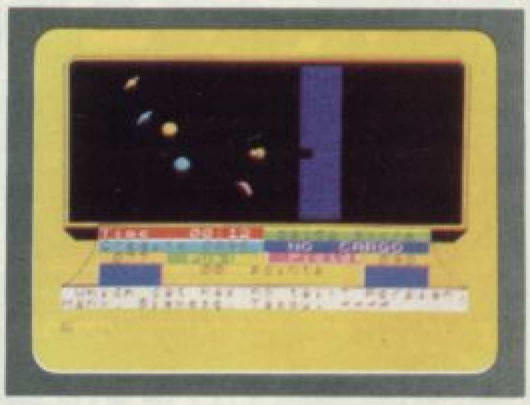
Argus Press Software/£7.95

This is an easy learning program for the over-nines where the pupil (player) has to answer simple questions before becoming a space pilot. Then the aim is to trade beyond hyperspace to find the power crystals. Strategy and clear thinking are necessary as you overcome such assorted hazards as asteroids, leaking fuel tanks and dust belts.

Alex: The idea is to answer the questions correctly and get the fuel you need to search for the power crystals. That done, movement is via the cursor keys, one character block at a time; of course as it's meant for nine-year olds, the speed is very slow. However, the graphics are quite clear, and made better by the simple but pleasing use of colour. There's also some nicely applied sound to increase enjoyment. **HIT**

Alan G: The originality factor is very high, but it's doubtful whether this program has any real educational value — or any degree of playability. It's very colourful, but the speed is far too slow (even for nine-year olds) and the sound can only be described as poor. Just because a program is aimed at the young is no reason for slap-dash presentation. **MISS**

Alan H: It might appeal to nine-year olds, but at nine-and-a-half you'd be too old for this one. The graphics are basic and uninteresting, the speed is too slow, and the colour fails to attract or excite. The



packaging's attractive and there's an offer of a *Clever Clogs* poster and a competition to enter. **MISS**

★ YS HIT ★ WORSE THINGS HAPPEN AT SEA ★

Silversoft/£5.95

The title's quite right, they do. The ship's sprung a leak and the sailor-robot needs to stop it — at the same time keeping the vessel on course, pumping out the water and oiling the engine. Remember to keep the hatches closed, or you'll perish sooner rather than later.

Alex: The ship is drawn very well, with clear and entertaining graphics. Judging by the number of screens that appear as you travel round, the size of the ship must be enormous. It's certainly quite a headache trying to stop the flood, but it gets a bit easier with practice. Overall, a program that'll keep you glued to the screen for ages.

Alan G: Not only is the idea behind the game very original, there's lots of things to do to keep you interested as well as busy. The graphics are highly detailed and the sailor-robot moves very smoothly. Most of the time it feels like you're fighting a losing battle, with the water flooding in.

Alan H: The superb graphics are unaffected by the excitingly high speed of the game — which is just about right — and the colourful display is also enjoyable, while still being reasonably realistic. But it's the idea which makes this program something special; there's really nothing like it available anywhere else. There's just one disturbing 'fault' (if that's what it is) which allows the boat to successfully make its first crossing without the player actually doing anything. Messing around in boats is great fun.

This part of the screen shows you how far you've managed to get across the sea.

This rather complicated looking area lets you know what state the ship's in.



The water is going to swallow you up and sink the ship if you're not nimble enough with the patching process.

This is the playing area and is where your droid repairs the leaks and closes the hatch doors.

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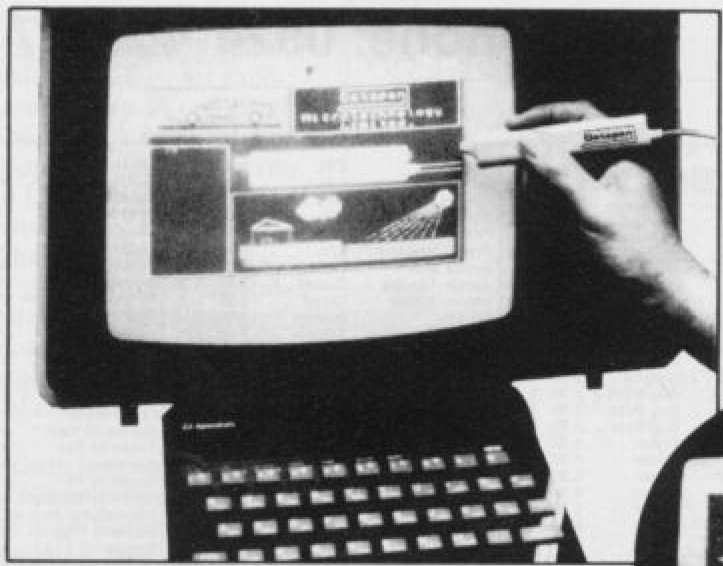
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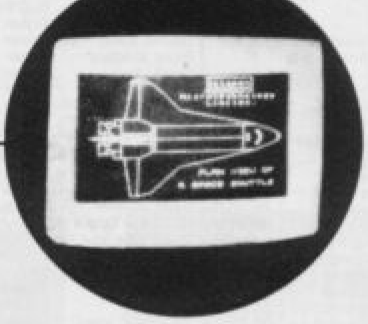
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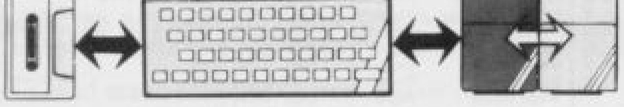
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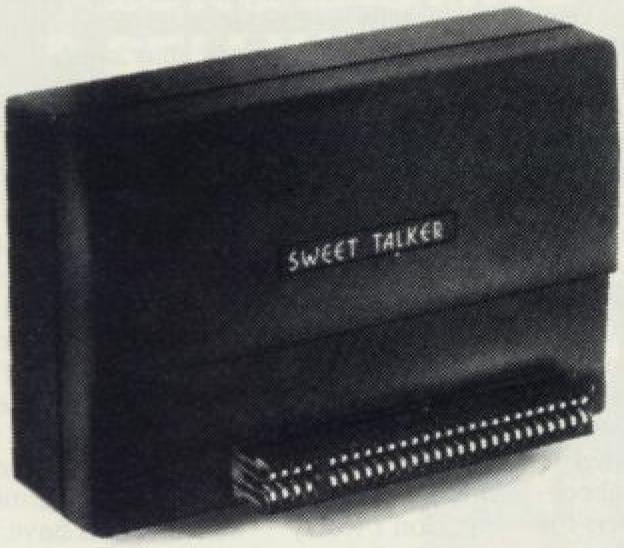
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RUNNING REPAIRS

Hands up those who've lost files on a Microdrive cartridge. Well, for goodness sake, don't throw it away because Andrew Pennell's beginning to solve the problem. Presented here is a way of examining and printing up the suspect sectors ... and there's more to come.

Good as the ZX Microdrives are, like all forms of media, they're not perfect. Every once in a while, faults occur that result in a 'File not found' message and, of course, Murphy's Law determines that this only happens to those that have not been backed-up.

The program I'm presenting is designed to enable 'repairs' to be made to corrupted and unloadable files. It's in two parts. The first (presented here) allows you to examine the cartridge for faults, and print out all damaged and suspect sectors. The second, to be included in a forthcoming issue, will allow individual sectors to be read in — even if faulty — corrected, then written out, so you can still recover the file. It won't be perfect, because badly corrupted files can be impossible to fix; however, it'll work for many.

SAVE YOUR SECTORS

Before delving into the program, let's examine first why sectors become unreadable. Usually, it's due to some mechanical or magnetic abuse that results in some part of the tape losing bits of data. Thus, when the Spectrum tries to read the affected sector, the data is altered and the checksum saved with it no longer matches — so loading fails to take place. What our section of machine code does is scan the cartridge, reading each sector (whether corrupted or not) and storing its particulars in a Basic array, z$. Given the sorted array, the Basic part then uses the information to calculate which sectors are damaged or missing altogether; the second stage uses this information to allow access to individual sectors, in order to re-create them.

Our first move will be to enter the 500-odds bytes of machine code. Those without an assembler will have to use the Hex loader given; enter the code correctly, then save it on to cartridge with:

SAVE* "m";1;"SL.CODE" CODE 30000,500
Next, enter the main program, and save it with:
SAVE*"m";1;"repair" LINE 9000

Note that line 130 will only be accepted with the machine code entered, and activated by RAND USR 30000.

CODE ANALYSIS

The code works by adding a command '*L' which scans a given cartridge, storing its details in the array z$(200,13); then it sorts the data using a bubble sort. NEWVEC is the additional syntax checker, which okays the statement, gets the 'drive number, alters it to suit the ROM, then does the actual work. Routine WATROM is similar to the one detailed in *All Change* (see the August issue), altering the CALLs in the program to suit whichever shadow ROM is in place. FIND is the main entry point. It starts by creating an 'm' area in CHANS, and putting the motor on; each sector is read in, and its checksum calculated to see if it has corrupted. The ROM checksum routine cannot be used as it alters the checksum byte — which makes it inpractical for part two. If the sector is used, its name, record number and sector number are stored in z$, along with a flag that shows if it's an EOF sector — and whether it's corrupted or not. The code at NEXT ensures the whole cartridge has been read, before closing the 'm' channel. The border is made green, and the sort routine entered.

SORT is a not very amazing bubble-sort routine. It sorts the elements of z$ into order, using the crudest sort of algorithm possible. I chose it for simplicity, not speed — though it is, of course, many times faster than anything in Basic. The routine can take up to a minute to sort a full cartridge; those feeling nervous are allowed to break into it while it sorts.

Routine NXHDBF, the most important one of all gets down to the business of scanning the tape, doing its checksum, and seeing if it's used or not. CHKSUM is basically the same as the one in the ROM, but with an instruction at the end removed. Finally, FINDZ$ is responsible for searching the variables area for the array z$, and finding the location of the first element. Note that no checks are made on the dimensions or size of the array, only its existence. If z$ is not the proper size, then Basic may crash — so beware.

ROUTINE ACTION

The business of examining the sector data is carried out in Basic — because it's easier to change, and speed is not relevant. After the '*L', each element of z$ contains 13 bytes of data: bytes one to 10 are the file-name, byte 11 the record number, byte 12 the sector, and byte 13 the flag. Option 1 prints all the file-names, like CAT but including CHR$ 0 file-names. While using it, you may get strange file-names at the top of the catalog; don't worry — all cartridges have a couple of strangely-named sectors on them (as a by-product of the FORMAT routine) all starting with CHR$ 0. Option 2 prints a sector list, which consists of each used sector, its file-name record number, sector number, and type. From this, you can work out what's missing from it, as record numbers should rise from zero up to one with EOF against it. It also tells you if any are corrupted, though you don't have to scan lines of information to find the faults; Option 3 prints all the corrupted sectors, while Option 4 will examine all the sectors of a given file and tell you if any are missing or corrupted. As it's in Basic, you can change it to suit your needs.

All this allows you to find the faults in your cartridges; watch out for part two where you'll discover how to fix them.



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RUNNING REPAIRS

```
 100 RESTORE 1000: CLEAR 29999
 105 LET s=0
 110 FOR i=30000 TO 30465
 120 READ a: POKE i,a: LET s=s+a
 130 NEXT i
 140 IF s<>51998 THEN  PRINT "Da
ta error": STOP
 150 PRINT "Data OK"
1000 DATA 33,58,117,34,183,92
1010 DATA 1,0,0,201,198,206
1020 DATA 254,42,194,240,1,215
1030 DATA 32,0,246,32,254,108
1040 DATA 194,40,0,215,32,0
1050 DATA 205,30,6,205,183,5
1060 DATA 205,93,117,205,162,117
1070 DATA 195,193,5,33,122,117
1080 DATA 58,218,22,254,255,40
1090 DATA 3,33,142,117,6,5
1100 DATA 94,35,86,35,126,18
1110 DATA 35,126,19,18,35,16
1120 DATA 243,201,166,117,232,15
1130 DATA 178,117,247,23,164,118
1190 DATA 196,18,171,118,169,24
1200 DATA 32,118,169,18,166,117
1210 DATA 165,16,178,117,50,21
1220 DATA 164,118,169,19,171,118
1230 DATA 235,21,32,118,142,19
1240 DATA 205,225,118,205,232,15
1250 DATA 205,225,118,34,253,118
1260 DATA 221,126,25,205,247,23
1270 DATA 33,50,0,34,201,92
1280 DATA 205,163,118,245,221,12
6
1290 DATA 41,198,3,33,201,92
1300 DATA 190,56,1,119,241,40
1310 DATA 64,56,16,1,0,2
1320 DATA 221,229,225,17,82,0
1330 DATA 25,205,204,118,40,1
1340 DATA 55,8,42,253,118,221
1350 DATA 229,6,10,221,126,71
1360 DATA 119,35,221,35,16,247
1370 DATA 221,225,221,126,68,119
1380 DATA 35,221,126,41,119,35
1390 DATA 221,70,67,203,40,203
1400 DATA 184,8,48,2,203,248
1410 DATA 112,35,34,253,118,33
1420 DATA 202,92,126,60,119,43
1430 DATA 190,56,163,221,203,24
1440 DATA 134,42,75,92,229,205
1450 DATA 169,18,209,42,75,92
1460 DATA 167,237,82,62,4,211
1470 DATA 254,237,91,253,118,25
1480 DATA 34,253,118,175,8,42
1490 DATA 253,118,229,221,225,22
1
1500 DATA 54,11,255,17,230,255
1510 DATA 25,235,33,13,0,25
1520 DATA 235,229,213,205,225,11
8
1530 DATA 209,167,237,82,225,48
1540 DATA 2,32,15,8,167,32
1550 DATA 216,58,72,92,15,15
1560 DATA 15,230,7,211,254,201
1570 DATA 229,213,215,84,31,56
1580 DATA 5,253,54,0,20,239
1590 DATA 6,13,26,190,56,15
1600 DATA 32,4,19,35,16,246
1610 DATA 209,225,235,1,243,255
1620 DATA 9,24,194,209,225,1
1630 DATA 13,0,9,235,9,235
1640 DATA 6,13,43,27,26,78
1650 DATA 119,121,18,16,247,8
1660 DATA 62,1,8,24,223,205
1670 DATA 196,18,17,27,0,25
1680 DATA 205,169,24,1,14,0
1690 DATA 205,204,118,40,2,55
1700 DATA 201,221,203,67,70,32
1710 DATA 13,221,126,67,221,182
1720 DATA 70,230,2,200,62,255
1730 DATA 183,201,175,201,229,30
1740 DATA 0,123,134,35,206,1
1750 DATA 40,1,61,95,11,120
1760 DATA 177,32,242,123,190,225
1770 DATA 201,42,75,92,126,254
1780 DATA 128,32,5,253,54,0
1790 DATA 1,239,254,218,32,5
1800 DATA 1,8,0,9,201,215
1810 DATA 184,25,235,24,231,0
1820 DATA 0,0,208,1
```

This is the machine code installer for those of you who don't have the luxury of an assembler. If you are using this program then the assembler listing below is unnecessary. Note that line 130 will only be accepted with the machine code entered and by RAND USR 30000.

```
        ORG   30000
        LD    HL,NEWVEC
        LD    (VECTOR),HL ; alter vector
        LD    BC,0
        RET
NEWVEC  ADD   A,206
        CP    "*"
        JP    NZ,#01F0
        RST   #10
        DEFW  #20 ;next char
        OR    #20 ;make it l.c.
        CP    "l"
        JP    NZ,#28 ;error if not L
        RST   #10
        DEFW  #20 ;next char
        CALL  #061E ;eval BC
        CALL  #05B7 ;check end
        CALL  WATROM ;redo to suit ROM
        CALL  FIND
        JP    #05C1
;
;modify routine for different ROMs
WATROM  LD    HL,OLDROM
        LD    A,(#16DA)
        CP    #FF
        JR    Z,YESOLD
        LD    HL,NEWROM ;to suit new ROM
YESOLD  LD    B,5 ;no of CALLs to alter
REDOLP  LD    E,(HL)
        INC   HL
        LD    D,(HL) ;DE=CALL+1
        INC   HL
        LD    A,(HL)
        LD    (DE),A
        INC   HL
        LD    A,(HL)
        INC   DE
        LD    (DE),A ;alter CALL
        INC   HL
        DJNZ  REDOLP
        RET
; data table for old ROM
OLDROM  DEFW  L1+1,#0FE8 ;CREATM
        DEFW  L2+1,#17F7 ;MOTOR
        DEFW  NXHDBF+1,#12C4 ;NEXTHD
        DEFW  L4+1,#18A9 ;RDBYTS
        DEFW  L5+1,#12A9 ;CLOSEM
;data table for new ROM
NEWROM  DEFW  L1+1,#10A5 ;CREATM
        DEFW  L2+1,#1532 ;MOTOR
        DEFW  NXHDBF+1,#13A9 ;NEXTHD
        DEFW  L4+1,#15EB ;RDBYTS
        DEFW  L5+1,#138E ;CLOSEM
; FIND
; finds all duff sectors
FIND    CALL  FINDZ$ ;check Z$ is there
L1      CALL  CREATM ;create M area
        CALL  FINDZ$
        LD    (FMARK),HL ;zero pointer
        LD    A,(IX+25)
L2      CALL  MOTOR ;switch on
        LD    HL,50
        LD    (SECTOR),HL ;minimum 50 sectors
FLOOP   CALL  NXHDBF ;next header & buffer
        PUSH  AF
        LD    A,(IX+41) ;SECNO
        ADD   A,3
        LD    HL,SECTOR
        CP    (HL)
        JR    C,LESS ;skip if less
        LD    (HL),A ;else store new sector length
LESS    POP   AF
        JR    Z,NEXT ;if not used
        JR    C,ISBAD ;if 1st checksum fails
        LD    BC,#200
        PUSH  IX
        POP   HL
        LD    DE,#52
        ADD   HL,DE
        CALL  CHKSUM
        JR    Z,ISBAD ;if 2nd checksum OK too
        SCF   ;if 2nd bad
ISBAD   EX    AF,AF' ;save good/bad flag
        LD    HL,(FMARK)
        PUSH  IX
        LD    B,10
LPNAM   LD    A,(IX+71)
        LD    (HL),A ;copy name into free area
        INC   HL
        INC   IX
        DJNZ  LPNAM
        POP   IX
        LD    A,(IX+68)
        LD    (HL),A ;store RECNUM
        INC   HL
        LD    A,(IX+41)
        LD    (HL),A ;store HDNUM
        INC   HL
        LD    B,(IX+67)
        SRA   B ;shift to lose bit 0
        RES   7,B
        EX    AF,AF'
        JR    NC,CHKOK2
        SET   7,B ;if chksum failed
CHKOK2  LD    (HL),B ;store flag
        INC   HL
        LD    (FMARK),HL
NEXT    LD    HL,SECTOR+1
        LD    A,(HL)
        INC   A
        LD    (HL),A ;inc count
        DEC   HL
        CP    (HL)
        JR    C,FLOOP ;if more to do
```

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RUNNING REPAIRS

```
        RES  0,(IX+24) ;ensure read file
        LD   HL,(VARS)
        PUSH HL
L5      CALL CLOSEM ;close area & motor off
        POP  DE
        LD   HL,(VARS)
        AND  A
        SBC  HL,DE ;HL=change in VARs
        LD   A,4
        OUT  (#FE),A ;green border while sorting
        LD   DE,(FMARK)
        ADD  HL,DE ;decrease FMARK suitably
        LD   (FMARK),HL
; THE BUBBLE SORT
;(no prizes for speed)
LENGTH EQU  13 ;=items in each record
SORT    XOR  A
        EX   AF,AF' ;zero sort flag
        LD   HL,(FMARK)
        PUSH HL
        POP  IX
        LD   (IX+11),#FF ;insert end marker
        LD   DE,-2*LENGTH
        ADD  HL,DE
        EX   DE,HL
        LD   HL,LENGTH
        ADD  HL,DE
        EX   DE,HL ;DE=lowest element, HL=1 above
STLP    PUSH HL
        PUSH DE
        CALL FINDZ$
        POP  DE
        AND  A
        SBC  HL,DE
        POP  HL ;Z if at start
        JR   NC,ENDED
        JR   NZ,NENDS
ENDED   EX   AF,AF' ; end of pass
        AND  A
        JR   NZ,SORT ;if not finished
        LD   A,(BORDCR)
        RRCA
        RRCA
        RRCA
        AND  #07
        OUT  (#FE),A ;restore border colour
        RET  ; then exit
NENDS   PUSH HL
        PUSH DE
        RST  #10
        DEFW #1F54 ;check break
        JR   C,NBRK
        LD   (IY+0),#14 ;force Break error
        RST  #28
NBRK    LD   B,LENGTH
ORDCHK  LD   A,(DE)
        CP   (HL)
        JR   C,SWOP ;if not in order
        JR   NZ,NOTSAM ;if different
        INC  DE
        INC  HL
        DJNZ ORDCHK ;do all chars
NOTSAM  POP  DE
        POP  HL
NXTBUB  EX   DE,HL ;move DE up
        LD   BC,-LENGTH
        ADD  HL,BC ;move HL up
        JR   STLP
;
SWOP    POP  DE
        POP  HL
        LD   BC,LENGTH
        ADD  HL,BC
        EX   DE,HL
        ADD  HL,BC
        EX   DE,HL
        LD   B,LENGTH
SWLP    DEC  HL
        DEC  DE
        LD   A,(DE)
        LD   C,(HL)
        LD   (HL),A
        LD   A,C
        LD   (DE),A ;swop bytes
        DJNZ SWLP ;do all chars
        EX   AF,AF'
        LD   A,1 ;show 'sorted'
        EX   AF,AF'
        JR   NXTBUB
;
; read next sector
; Z if not used
; else C if chk fails
; or NC if chk OK
NXHDBF  CALL NEXTHD ;next header
        LD   DE,#1B
        ADD  HL,DE
L4      CALL RDBYTS ;read the data
        LD   BC,#E
        CALL CHKSUM
        JR   Z,CHKOK
        SCF  ;if chk fails
        RET
CHKOK   BIT  0,(IX+67)
        JR   NZ,BAD
        LD   A,(IX+67)
        OR   (IX+70)
        AND  2
        RET  Z ;if not used
        LD   A,#FF
        OR   A
        RET  ;if sector OK
BAD     XOR  A
        RET
;
; CHECKSUM CALCULATOR
CHKSUM  PUSH HL
        LD   E,0
L134C   LD   A,E
        ADD  A,(HL)
        INC  HL
        ADC  A,1
        JR   Z,L1354
        DEC  A
L1354   LD   E,A
        DEC  BC
        LD   A,B
        OR   C
        JR   NZ,L134C
        LD   A,E
        CP   (HL)
        POP  HL
        RET
;
; FIND Z$
; returns with HL=start of elements in z$
FINDZ$  LD   HL,(VARS)
VARLP   LD   A,(HL)
        CP   128
        JR   NZ,MORVAR ;if more variables left
        LD   (IY+0),#1
        RST  #28 ;"Variable not found"
MORVAR  CP   "Z"+128
        JR   NZ,NOTZ$
        LD   BC,8
        ADD  HL,BC ; skip over other bytes in array
        RET
NOTZ$   RST  #10
        DEFW #19B8 ;get next variable start
        EX   DE,HL
        JR   VARLP ;try again with next one
; CONSTANTS
CREATM EQU  #0FE8
MOTOR  EQU  #17F7
NEXTHD EQU  #12C4
RDBYTS EQU  #18A9
CLOSEM EQU  #12A9
BORDCR EQU  #5C48
VARS   EQU  #5C4B
VECTOR EQU  #5CB7
SECTOR EQU  #5CC9
PRTBC  EQU  #1A1B
FMARK  DEFW 0
TEMPA  DEFB 0
*D+
*L+
        DEFW $-30000
```

The assembly listing (above) and the Basic program (on the next page) are both required to be in memory before you run the program. The code needs to be organised from 30000 if you are using an assembler and the code can be saved as SAVE "SL.CODE" CODE 30000,466.

(on the next page)

```
 100 INPUT "Drive number ";d
 110 IF d<1 OR d>8 THEN  GO TO 1
00
```

Lines 100-110 Get the drive number.

```
 120 DIM z$(200,13): DIM n$(13)
```

Line 120 Initialises the arrays.

```
 130 *L d
```

Line 130 Calls the machine code via the Shadow ROM.

```
 135 PRINT "Wait a sec..."
 139 REM find last item
 140 FOR i=1 TO 200
 150 IF z$(i,12)<>CHR$ 255 THEN
 NEXT i
 160 LET n=i-1
```

Lines 135-160 The beginning of the initialisation loop.

```
 169 REM ove repititions
 170 FOR i=2 TO n
 180 IF z$(i)<>z$(i-1) THEN  GO
 TO 190
 182 IF CODE z$(i,13)>127 THEN
 LET z$(i)=n$: GO TO 190
 184 LET z$(i-1)=n$
 190 NEXT i
```

Lines 169-190 A complex nested loop to sort the file information.

```
 200 LET c=2
 1000 CLS : PRINT  INVERSE 1;"
   MICRODRIVE REPAIR KIT       "
 1005 PRINT ''"0. Output to ";"pr
 inter" AND c=2;"screen" AND c=3
 1010 PRINT '"1. Full catalogue"
 1020 PRINT '"2. Sector list"
 1030 PRINT '"3. Bad sector list"
 1040 PRINT '"4. Check file"
 1090 PRINT
```

Lines 200-1090 The menu for the main routines.

```
 1095 INPUT ;: PRINT #0;"Choose a
 n option";
 1100 PAUSE 0: LET a$=INKEY$
 1110 IF a$<"0" OR a$>"4" THEN  G
 O TO 1100
 1120 IF a$="0" THEN  LET c=5-c:
 GO TO 1000
 1130 GO SUB 1000+1000*VAL a$
 1140 IF c=2 THEN  PRINT "Press a
 ny key for menu": PAUSE 0
 1150 GO TO 1000
```

Lines 1095-1150 Read the keyboard and perform the relevant operation.

```
 1999 REM Full catalogue
 2000 PRINT #c;"Full catalogue"
 2010 DIM f$(10): LET f$=z$(1)
 2020 FOR i=1 TO n
 2030 IF z$(i)=n$ OR z$(i, TO 10)
 =f$ THEN  GO TO 2060
 2040 PRINT #c;f$( TO 10)
 2050 LET f$=z$(i, TO 10)
 2060 NEXT i
 2065 PRINT #c;z$(n, TO 10)
 2070 RETURN
```

Lines 1999-2070 The routine which prints out a full catalogue of the cartridge.

```
 2999 REM Complete sector list
 3000 DIM f$(10): INPUT "Filename
  (or ENTER for all):",f$
 3010 FOR i=1 TO n
 3015 IF z$(i)=n$ THEN  GO TO 303
 0
 3020 IF f$=n$( TO 10) THEN  GO S
 UB 9500: GO TO 3030
 3025 IF z$(i, TO 10)=f$ THEN  GO
  SUB 9500
 3030 NEXT i
```

Lines 2999-3040 This routine prints a full sector list of the cartridge.

```
 3040 RETURN
 3999 REM Bad sector list
 4000 PRINT #c;"Bad sector list"
 4010 FOR i=1 TO n
 4020 IF z$(i)<>n$ AND z$(i,13)>C
 HR$ 127 THEN  GO SUB 9500
 4030 NEXT i
 4040 RETURN
```

Lines 3999-4040 This routine prints a select list of the bad sectors on the cartridge.

```
 4999 REM Check file
 5000 DIM f$(10): INPUT "Filename
 ? ";f$
 5005 DIM x$(256): LET eof=-1: LE
 T good=1
 5010 FOR i=1 TO n
 5020 IF z$(i, TO 10)<>f$ THEN  G
 O TO 5100
 5030 IF z$(i,13)>CHR$ 127 THEN
 GO TO 5060
 5039 REM good sector
 5040 LET x$(CODE z$(i,11)+1)="y"
 5050 GO TO 5080
 5059 REM bad sector
 5060 PRINT #c;"Record ";CODE z$(
 i,11);" bad on sector ";CODE z$(
 i,12)
 5070 LET good=0
 5080 LET a=CODE z$(i,13)
 5090 IF a/2<>INT (a/2) THEN  LET
  eof=CODE z$(i,11)
 5100 NEXT i
 5110 IF eof>=0 THEN  GO TO 5120
 5111 REM missing EOF
 5112 FOR i=200 TO 1 STEP -1
 5114 IF x$(i)=" " THEN  NEXT i
 5116 LET eof=i-1
 5118 LET good=0: PRINT #C;"No EO
 F record"
 5120 FOR i=0 TO eof
 5130 IF x$(i+1)=" " THEN  PRINT
 "Record ";i;" missing": LET good
 =0
 5140 NEXT i
 5150 IF good=1 THEN  PRINT "File
  ";f$;" intact"
 5160 IF good=0 THEN  PRINT "File
  ";f$;" corrupted"
 5170 RETURN
```

Lines 4999-5170 Break down each individual file.

```
 9000 CLEAR 29999: LOAD *"m";1;"S
 L.CODE"CODE : RANDOMIZE USR 3000
 0: RUN
```

Line 9000 Loads and calls the machine code.

```
 9500 PRINT #c;z$(i, TO 10);" r";
 CODE z$(i,11);TAB 16;"s";CODE z$
 (i,12);TAB 21;
 9510 LET f=CODE z$(i,13)
 9520 IF f/2<>INT (f/2) THEN  PRI
 NT #c;"EOF";
 9530 IF CODE z$(i,13)>127 THEN
 PRINT #c;TAB 25;"BAD";
 9540 PRINT #c
 9550 RETURN
```

Lines 9500-9550 The subroutine used to display file status, ie whether or not it's corrupted. YS

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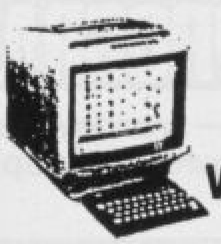
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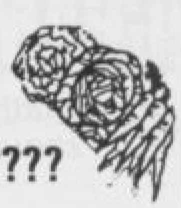
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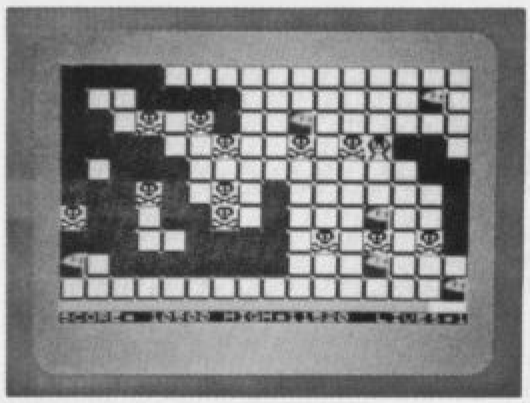
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YS *proudly presents* **Stampabout** — *arcade action in 100 per cent machine code! Any contributions should be sent to* **Program Power, Your Spectrum, 14 Rathbone Place, London W1P 1DE.**



It's fast and furious action all the way as Happy Horace attempts to defuse the flashing bombs.

STAMPABOUT

BY MARK ROBERTS

This is our first 100 per cent machine code game and it's based on the old arcade epic, *Time Bomb*. For those who've not crossed its path before (*Where have you been? Ed.*), it involves a character called Happy Horace and his attempts to defuse a number of bombs.

Before getting down to details, here first is how you get the code safely into your Speccy. First type in the machine code loader program and SAVE it to tape. Next type in the Hex loader program and RUN it. It'll accept eight bytes at a time (without spaces) and then ask for a checksum (which is given after the eight hex pairs). (You can enter eight zero bytes using a capital 'o' — which will save time towards the end of the code.) You'll then be asked to SAVE the code after the short loader program. This done, reset the Speccy, rewind the tape to the beginning, enter LOAD "" and press Play. That's all there is to it!

In *Stampabout,* you're presented with a grid of squares, one of which contains the character Happy Horace. On another square you'll see a flashing bomb which must be defused by moving Horace across to it. The trouble is, his path is blocked by death-dealing skulls and a stomping boot — which are definitely to be avoided. You'll also find that once Horace has moved off a square, it'll sink — which means when he comes to search for another bomb, his path may be littered with pitfalls.

Once Horace has defused four bombs, he moves on to a higher level that sets even more obstacles in the way. Each bomb must be defused within a set time limit — indicated at the bottom of the screen on a sliding scale. There's also a high score feature where bonus points can be collected by manoeuvering Horace into the flags.

Controls for the game are comprehensive — use the 'F' key for left, 'G' for right, 'T' for up, 'V' for down, and 'D' to scroll the row left and 'Y' to scroll the row right. If you have an AGF, Kempston or Interface 2 type joystick, then you can opt for one of these choices. (To scroll the row using joystick control, press the Fire button while simultaneously pushing the joystick left or right.)

Shown below is the short loader program which should be SAVEd to tape. Next, you've to type in the Hex loader and RUN it; it'll accept eight bytes at a time of the main Hex listing, and then ask for the checksum at the end of each line. Now SAVE the code *after* the loader, rewind the tape and type LOAD "". That's all there is to it.

```
  10 PAPER 0: INK 7
  20 BRIGHT 1: FLASH 0: CLS
  30 BORDER 7
  40 FLASH 1: INK 6: PAPER 2
  50 PRINT AT 10,5;"STAMP ABOUT
IS LOADING"
  60 PRINT AT 12,10;"PLEASE WAIT
"
  70 INK 0: PAPER 0: FLASH 0
  80 PRINT AT 0,0;
  90 LOAD ""CODE
 100 RANDOMIZE USR 25000
 200 SAVE "STAMPABOUT" LINE 10:
SAVE "CODE"CODE 25000,4000
```

```
   1 REM HEX loader for Stampabo
ut
   5 POKE 23658,8
   9 CLEAR 24999
  10 FOR i=25000 TO 29000 STEP 8
  20 LET cs=0
  30 PRINT AT 0,0;"Address ";i
  40 INPUT "Hex 8 Bytes", LINE a
$
  50 IF a$="O" THEN  LET a$="000
0000000000000"
  60 IF LEN a$<>16 THEN  GO TO 1
000
  80 LET f=0: FOR j=1 TO 16
  90 IF (a$(j)<"0" OR a$(j)>"9")
 AND (a$(j)<"A" OR a$(j)>"F") TH
EN  LET f=1
 100 NEXT j
 105 FOR n=0 TO 7
 110 IF f=1 THEN  GO TO 1000
 120 LET y=CODE a$(1)-48: IF y>9
 THEN  LET y=y-7
 130 LET z=CODE a$(2)-48: IF z>9
 THEN  LET z=z-7
 140 LET va=16*y+z
 150 LET cs=cs+va
 160 POKE i+n,va
 165 PRINT AT 2,n*3;a$( TO 2)
 170 LET a$=a$(3 TO )
 180 NEXT n
 183 INPUT "CHECKSUM "; LINE A$
 184 PRINT AT 2,25;A$
 185 IF VAL A$<>CS THEN  GO TO 1
000
 187 CLS
 190 NEXT I
 200 CLS : PRINT "SAVE CODE AFTE
R BASIC LOADER."''"REMOVE EAR LE
AD"
 210 SAVE "STAMPABOUT"CODE 25000
,4000
 220 CLS : PRINT "VERIFYING"
 230 VERIFY ""CODE
 240 CLS : PRINT "ALL OK": STOP
1000 PRINT AT 15,0;"ERROR": GO T
O 20
```

```
25000 F3 C3 E5 62 00 00 00 00 =765
25008 00 00 00 00 00 00 00 00 =0
25016 00 53 43 4F 52 45 3D 20 =473
25024 20 20 20 20 30 20 48 49 =353
25032 47 48 3D 20 20 20 20 30 =380
25040 20 20 4C 49 56 45 53 3D =512
25048 20 00 00 00 00 00 00 00 =32
25056 4C 45 56 45 4C 20 2D 20 =485
25064 20 20 20 50 72 65 73 73 =621
25072 20 61 6E 79 20 6B 65 79 =721
25080 20 74 6F 20 70 6C 61 79 =729
25088 20 61 67 61 69 6E 20 20 =608
25096 30 30 30 30 30 30 30 30 =384
25104 30 30 30 30 30 30 30 30 =384
25112 30 30 30 30 47 20 41 20 =392
25120 4D 20 45 20 20 4F 20 56 =439
25128 20 45 20 52 53 54 41 4D =524
25136 50 20 20 41 42 4F 55 54 =523
25144 42 59 20 4D 2E 52 4F 42 =537
25152 45 52 54 53 59 4F 55 52 =653
25160 20 53 43 4F 52 45 2D 48 =529
25168 49 47 48 20 53 43 4F 52 =559
25176 45 2D 50 52 45 53 53 20 =543
25184 27 50 27 20 54 4F 20 50 =465
25360 3E 13 D7 3E 00 D7 3E 12 =653
25368 D7 3E 00 D7 21 00 40 11 =606
25192 4C 41 59 50 52 45 53 53 =627
25200 20 27 43 27 20 54 4F 20 =404
25208 43 48 41 4E 47 45 20 43 =521
25216 4F 4E 54 52 4F 4C 53 43 =628
25224 4F 4E 54 52 4F 4C 20 54 =594
```

```
25232 59 50 45 20 2D 31 20 3D =457
25240 20 4B 45 59 42 4F 41 52 =557
25248 44 32 20 3D 20 4B 45 4D =464
25256 50 53 54 4F 4E 20 4A 4F =589
25264 59 53 54 49 43 4B 33 20 =554
25272 3D 20 49 4E 54 45 52 46 =549
25280 41 43 45 32 2F 49 32 4C =497
25288 34 20 3D 20 43 55 52 53 =494
25296 4F 52 20 2F 20 41 2E 47 =454
25304 2E 46 00 00 00 00 00 00 =116
25312 20 01 00 00 00 3E 02 CD =302
25320 01 16 21 B0 61 AF 77 23 =658
25328 77 3E 01 32 E1 62 C3 B0 =926
25336 65 3E 01 32 B6 61 AF 21 =701
25344 B2 61 77 23 77 3E 03 32 =663
25352 B4 61 3E 14 D7 3E 00 D7 =851
25376 01 40 01 FF 17 36 00 ED =635
25384 B0 21 00 58 11 01 58 01 =404
25392 BF 02 36 31 ED B0 3E 11 =788
25400 D7 3E 01 D7 3E 10 D7 3E =848
25408 07 D7 3E 16 D7 3E 0A D7 =809
25416 3E 0C D7 21 E0 61 06 08 =657
25424 CD 55 6D 21 B6 61 2B CD =959
25432 28 1A 06 32 CD 52 6D 10 =534
25440 FB 21 00 58 11 01 58 01 =479
25448 BF 02 36 36 ED B0 CD 6C =1027
25456 6A 06 00 0E 00 C5 26 01 =362
25464 2E 06 11 05 00 CD 03 67 =385
25472 11 05 00 CD 4A 67 C1 0C =609
25480 79 FE 10 C2 75 63 04 78 =925
25488 FE 0A C2 73 63 3E 05 32 =789
25496 AE 61 3E 08 32 AC 61 0E =674
25504 08 06 05 11 00 00 26 01 =75
```

```
25512 2E 06 CD 03 67 CD 4A 67 =745
25520 3A B6 61 CB 27 CB 27 C6 =1019
25528 05 F5 CD 72 67 E6 0F 4F =996
25536 CD 72 67 E6 07 47 CD 72 =1049
25544 67 E6 02 80 47 11 01 00 =552
25552 26 00 2E 05 CD 5E 67 FE =746
25560 05 C2 BA 63 CD 03 67 CD =1000
25568 4A 67 CD 72 67 E6 0F 4F =923
25576 CD 72 67 E6 07 47 CD 72 =1049
25584 67 E6 02 80 47 11 03 00 =554
25592 26 02 2E 05 CD 5E 67 FE =747
25600 05 C2 E2 63 CD 03 67 CD =1040
25608 4A 67 F1 D6 01 C2 B9 63 =1111
25616 3E 01 32 DC 62 CD 72 67 =853
25624 E6 0F 4F CD 72 67 E6 07 =983
25632 47 CD 72 67 E6 02 80 47 =924
25640 11 02 00 26 00 2E 04 CD =312
25648 5E 67 FE 05 FA 15 64 FE =1081
25656 00 CA 15 64 3E 12 D7 3E =680
25664 01 D7 3E 13 D7 3E 01 D7 =790
25672 CD 03 67 3E 12 D7 3E 00 =668
25680 D7 3E 13 D7 3E 00 D7 CD =993
25688 4A 67 3E 16 D7 3E 14 D7 =773
25696 3E 00 D7 3E 10 D7 3E 03 =635
25704 D7 3A E0 62 47 3E 8F D7 =1086
25712 10 FB 3A E0 62 3D 32 E3 =985
25720 62 3E 19 32 E4 62 3D 32 =672
25728 E2 62 3A E4 62 3D 32 DF =1042
25736 61 3C 3C 32 DE 61 AF 32 =811
25744 DD 61 CD 52 6D FB 3A DF =1246
25752 61 3C 32 DF 61 47 3A DE =878
25760 61 B8 C2 C8 64 AF 32 DF =1223
25768 61 3A DD 61 C6 00 C2 B4 =1045
```

```
25776 64 CD 5B 6D AF 32 DE 62 =1050
25784 3A DD 61 FE 01 CC A4 6D =1108
25792 3A DE 62 FE 01 CA 3F 65 =999
25800 3A E2 62 47 3A E4 62 CB =1040
25808 3F B8 C2 01 65 CD C1 67 =1044
25816 3A DE 62 FE 00 CA F7 64 =1181
25824 FE 01 CA 3F 65 3A DE 62 =999
25832 FE 02 CA 15 64 FE 03 CA =1038
25840 0A 63 FE 05 CA 14 65 21 =724
25848 19 00 11 1E 00 CD B5 03 =461
25856 F3 3A E2 62 3C 32 E2 62 =1059
25864 47 3A E4 62 B8 C2 92 64 =1079
25872 AF 32 E2 62 21 32 00 11 =649
25880 64 00 CD B5 03 3E 11 D7 =783
25888 3E 06 D7 3E 16 D7 3E 14 =664
25896 D7 3A E3 62 D7 3E 20 D7 =1122
25904 3A E3 62 3D 32 E3 62 FE =1073
25912 FF C2 92 64 CD 9B 67 3A =1216
25920 B4 61 3D 32 B4 61 C6 00 =863
25928 C2 0A 63 21 B2 61 56 23 =732
25936 5E 21 B0 61 46 23 4E EB =818
25944 ED 42 DA 69 65 21 B2 61 =1035
25952 56 23 5E 21 B0 61 72 23 =670
25960 73 3E 14 D7 3E 00 D7 3E =751
25968 12 D7 3E 00 D7 3E 13 D7 =806
25976 3E 00 D7 CD 6C 6A 3E 16 =780
25984 D7 3E 0A D7 3E 08 D7 3E =849
25992 12 D7 3E 01 D7 3E 13 D7 =807
26000 3E 01 D7 3E 11 D7 3E 02 =636
26008 D7 3E 10 D7 3E 06 D7 06 =797
26016 10 21 1C 62 7E 23 D7 10 =567
26024 FB 06 32 CD 52 6D 10 FB =970
26032 21 00 40 11 01 40 3E FF =496
26040 01 00 18 77 ED B0 21 00 =590
26048 58 11 01 58 01 BF 02 3E =450
26056 00 77 ED B0 3E 00 D3 FE =1059
26064 CD 01 16 3E 11 D7 3E 07 =591
26072 D7 3E 16 D7 3E 00 D7 3E =853
26080 00 D7 06 40 3E 20 D7 10 =610
26088 FB 3E 02 CD 01 16 CD 65 =849
26096 66 F3 C3 2C 66 3A DF 62 =1065
26104 06 1F 21 00 58 E6 07 EE =633
26112 40 77 3C 23 10 F7 11 20 =590
26120 00 06 15 77 3C E6 07 EE =681
26128 40 19 10 F7 06 1F 77 3C =568
26136 E6 07 EE 40 2B 10 F7 06 =851
26144 15 77 3C E6 07 EE 40 ED =976
26152 52 10 F6 C9 CD F5 65 3A =1154
26160 DF 62 3D 32 DF 62 E6 0F =998
26168 EE 80 6F 26 00 5F 16 00 =632
26176 13 CD B5 03 F3 3E DF DB =1155
26184 FE E6 01 CA F9 62 3E FE =1350
26192 DB FE 32 B8 61 E6 08 CC =1246
26200 8C 6C 3A B8 61 E6 08 CA =1027
26208 B0 65 C3 2C 66 3E 10 D7 =911
26216 3E 07 D7 3E 13 D7 3E 01 =643
26224 D7 3E 11 D7 3E 00 D7 3E =848
26232 16 D7 3E 04 D7 3E 0A D7 =805
26240 21 2C 62 06 0C 7E 23 D7 =569
26248 10 FB 3E 16 D7 3E 05 D7 =848
26256 3E 0A D7 06 0C 3E 8C D7 =722
26264 10 FB 3E 16 D7 3E 07 D7 =850
26272 3E 0A D7 06 0C 7E 23 D7 =681
26280 10 FB 3E 16 D7 3E 0A D7 =853
26288 3E 08 D7 06 0B 7E D7 23 =678
26296 10 FB E5 21 B2 61 CD 28 =1049
26304 1A 3E 30 D7 E1 3E 16 D7 =875
26312 3E 0C D7 3E 08 D7 06 0B =591
26320 7E D7 23 10 FB E5 21 B0 =1081
26328 61 CD 28 1A 3E 30 D7 E1 =918
26336 3E 16 D7 3E 0F D7 3E 07 =660
26344 D7 06 11 7E D7 23 10 FB =881
26352 3E 16 D7 3E 11 D7 3E 02 =657
26360 D7 06 1C 7E D7 23 10 FB =892
26368 C9 FB C9 3E 10 D7 7C D7 =1285
26376 3E 11 D7 7D D7 E5 C5 D5 =1273
26384 CB 21 CB 20 EB 29 29 29 =829
26392 29 29 EB 21 34 6F 19 EB =805
26400 C5 01 20 00 2A 7B 5C EB =722
26408 ED B0 C1 3E 16 D7 78 D7 =1240
26416 79 D7 3E 90 D7 3E 92 D7 =1180
26424 3E 16 D7 78 3C D7 79 D7 =1030
26432 3E 91 D7 3E 93 D7 D1 C1 =1248
26440 E1 C9 C5 E5 68 26 00 29 =1035
26448 29 29 29 06 00 09 01 48 =211
26456 71 09 73 E1 C1 C9 C5 E5 =1282
26464 68 26 00 29 29 29 29 06 =312
26472 00 09 01 48 71 09 7E E1 =555
26480 C1 C9 E5 C5 2A DA 62 46 =1248
26488 23 3E 3F A4 67 78 22 DA =799
26496 62 C1 E1 C9 3E 00 F5 CD =1229
26504 72 67 6F 26 01 11 0A 00 =394
26512 CD B5 03 F1 3C FE FF C2 =1393
26520 86 67 C9 3E 78 F5 21 00 =898
26528 58 11 01 58 01 7F 02 E6 =554
26536 07 CE 10 77 ED B0 6F 26 =910
26544 01 11 28 00 CD B5 03 F3 =690
26552 F1 3C FE FF C2 9D 67 C9 =1465
26560 C9 AF 32 DE 62 3A AE 61 =1075
26568 32 AF 61 3A AC 61 32 AD =872
26576 61 3A E1 62 FE 01 CC F2 =1179
26584 67 3A E1 62 FE 02 CC E5 =1173
26592 6B 3A E1 62 FE 03 CC 4E =1027
26600 6C 3A E1 62 FE 04 CC 0B =962
26608 6C C9 3E 7F DB FE E6 10 =1217
26616 CA 33 68 3E FB DB FE E6 =1373
26624 10 CA 48 68 3E FD DB FE =1182
26632 32 DD 62 E6 10 CA 28 6A =963
26640 3A DD 62 E6 08 CA 14 6A =943
26648 3A DD 62 E6 04 CA AD 6A =1092
26656 3E FE DB FE E6 10 CA 3C =1297
26664 6A 3E DF DB FE E6 10 CA =1312
26672 F7 6A C9 3E FD DB FE 32 =1392
26680 DD 62 E6 10 CA F7 6A 3A =1178
26688 DD 62 E6 08 CA AD 6A C9 =1239
26696 3A AE 61 3D 32 AE 61 FE =965
26704 FF C2 59 68 3E 09 32 AE =937
26712 61 3A AE 61 47 3A AC 61 =824
26720 4F CD A1 68 3A DE 62 FE =1181
26728 01 C8 3A DE 62 FE 02 CA =1037
26736 75 68 CD 8B 68 3A AC 61 =996
26744 4F 3A AE 61 47 26 01 2E =564
26752 06 11 00 00 CD 03 67 CD =539
26760 4A 67 C9 3A AD 61 4F 3A =843
26768 AF 61 47 11 06 00 2E 05 =417
26776 26 00 CD 03 67 CD 4A 67 =731
26784 C9 3A AE 61 47 3A AC 61 =928
26792 4F CD 5E 67 32 DD 62 3A =908
26800 DD 62 FE 01 CC 02 69 3A =943
26808 DD 62 FE 03 CC ED 68 3A =1179
26816 DD 62 FE 06 CC E0 68 3A =1169
26824 DD 62 FE 05 CC FF 69 3A =1200
26832 DD 62 FE 02 CC 4F 69 3A =1021
26840 DD 62 FE 07 CC 02 69 C9 =1092
26848 3A AF 61 32 AE 61 3A AD =882
```

```
26856 61 32 AC 61 C9 21 B2 61 =925
26864 56 23 5C 21 0F 00 19 EB =523
26872 21 B2 61 72 23 73 CD 50 =857
26880 6A C9 CD 8B 68 06 00 C5 =958
26888 3E 14 D7 78 E6 01 D7 3A =921
26896 AE 61 47 3A AC 61 4F 11 =765
26904 00 00 26 07 2E 02 CD 03 =301
26912 67 CD 72 67 6F 26 00 11 =691
26920 28 00 CD B5 03 C1 10 D7 =853
26928 3E 01 32 DE 62 3A AE 61 =762
26936 47 3A AC 61 4F 26 07 2E =568
26944 00 11 04 00 CD 03 67 06 =338
26952 64 CD 52 6D 10 FB C9 06 =970
26960 05 C5 3E 00 F5 E6 0F D3 =965
26968 FE EE 40 6F 26 00 16 00 =727
26976 5F 1C CD B5 03 F3 F1 3C =1056
26984 FE 1E C2 54 69 C1 10 E1 =1101
26992 21 B2 61 56 23 5E 21 64 =656
27000 00 19 EB 21 B2 61 72 23 =717
27008 73 CD 50 6A CD 6C 6A 3A =983
27016 DD 61 FE 01 C2 A4 69 3A =1094
27024 AE 61 47 3A AC 61 4F 11 =765
27032 01 00 26 00 2E 06 CD 03 =299
27040 67 CD 4A 67 3A AF 61 32 =865
27048 AE 61 47 3A AD 61 32 AC =892
27056 61 4F 11 00 00 26 01 2E =278
27064 06 CD 03 67 CD 4A 67 3A =757
27072 DA 61 47 3A D9 61 4F 26 =875
27080 05 2E 05 11 06 00 CD 03 =287
27088 67 CD 4A 67 3E 02 32 DE =821
27096 62 3A DC 62 3C 32 DC 62 =902
27104 FE 06 C2 FE 69 3A E0 62 =1193
27112 FE 10 FA FE 69 3D 3D 32 =1051
27120 E0 62 3A B6 61 3C 32 B6 =951
27128 61 3E 03 32 DE 62 C9 21 =766
27136 B2 61 56 23 5E 21 01 00 =524
27144 19 EB 21 B2 61 72 23 73 =832
27152 CD 50 6A C9 3A AC 61 3D =980
27160 32 AC 61 FE FF C2 25 6A =1165
27168 3E 0F 32 AC 61 C3 59 68 =784
27176 3A AC 61 3C 32 AC 61 FE =960
27184 10 C2 39 6A 3E 00 32 AC =657
27192 61 C3 59 68 3A AE 61 3C =874
27200 32 AE 61 FE 0A C2 4D 6A =962
27208 3E 00 32 AE 61 C3 59 68 =771
```

```
27216 3E 10 D7 3E 06 D7 3E 11 =655
27224 D7 3E 01 D7 3E 16 D7 3E =854
27232 15 D7 3E 07 D7 21 B2 61 =828
27240 CD 28 1A C9 3E 10 D7 3E =827
27248 06 D7 3E 11 D7 3E 01 D7 =793
27256 3E 16 D7 3E 15 D7 3E 00 =659
27264 D7 21 B9 61 06 20 7E D7 =909
27272 23 10 FB CD 50 6A 3E 16 =777
27280 D7 3E 15 D7 3E 1F D7 3A =879
27288 B4 61 C6 30 D7 3E 16 D7 =1037
27296 3E 15 D7 3E 12 D7 21 B0 =802
27304 61 CD 28 1A C9 21 08 62 =708
27312 0E 00 3A AE 61 47 CD 5E =713
27320 67 77 23 0C 79 FE 10 C2 =854
27328 B6 6A 0E 00 CD 5E 67 77 =823
27336 21 08 62 23 3A AC 61 3D =562
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■ Want exchange of ideas and programs (games, utilities and astronomical programs), etc, for Spectrum 48K worldwide. Send letter or cassette to Thierry Kumps, Langeweg 193, B-1900, Overijse, Belgium.

■ Wanted *Beaky and the Egg Snatchers, Macro Construction and Animation* and Level 9's *Dungeon Adventure* — have large choice of original Spectrum software to swop. Phone 0472 70869, ask for Andrew.

■ Swop *White Lightning* by Oasis for *HURG* by Melbourne House (including manual). Also *Sabre Wulf* by Ultimate for *Lords of Midnight* by Beyond. PV Allen, 11a Hampton, Portesham, Dorset DT3 4EX.

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■ I am aged 15 and my name is Robert. I'm interested in computing, and would like a pen pal of the same age. Phone Devizes 6612.

■ I like tennis, computers, and watching TV. I am also interested in pop music and walking around the countryside. Phone Christopher on 061-427 3756.

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■ Roche ZX Computer Club (Cornwall) 0726 890473. Meets Monday 7pm to 10pm, Friday 7pm to 9pm. Mike Richards.

■ Gloucester's midweekly Spectrum User Group welcomes hackers, gamesters, multicore solderers and also ZX81 users. Age, experience, gender unimportant. Phone 0452 23186 and meet others in a free and easy atmosphere. ACC affiliated.

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■ Microdrive and Interface 1 wanted — must work! Phone 0437 890563 after 8pm (ask for Stuart). Reasonable price offered.

■ Has anybody cracked the action game on *Jokers Wild?* If so, please supply the running code for the adventure. S Cheesman, 24 Hazelby Road, Creswell, Worksop, Notts.

■ Wanted — Alphacom 32 Printer or ZX Interface 1 plus Microdrive. Will swop £56 worth of software, plus Cambridge Programmable Joystick Interface worth £27. N Magowan, 46 Drumlough Road, Hillsborough, Co. Down BT 6PX.

YOUR SPECTRUM OCTOBER ISSUE

CIRCE

Sue Denham ***discusses the show-biz world of software production with part-time philosopher*** **Mark Eyles,** ***Quicksilva's Creative Design Executive.***

There was a time when the term 'software house' accurately described the average Spectrum software supplier — simply because anyone who could put together a good enough package from home could start their own company. That's all changed now, especially with warning signs that some of the biggest names in Spectrum software are going to the wall — take Imagine, for example.

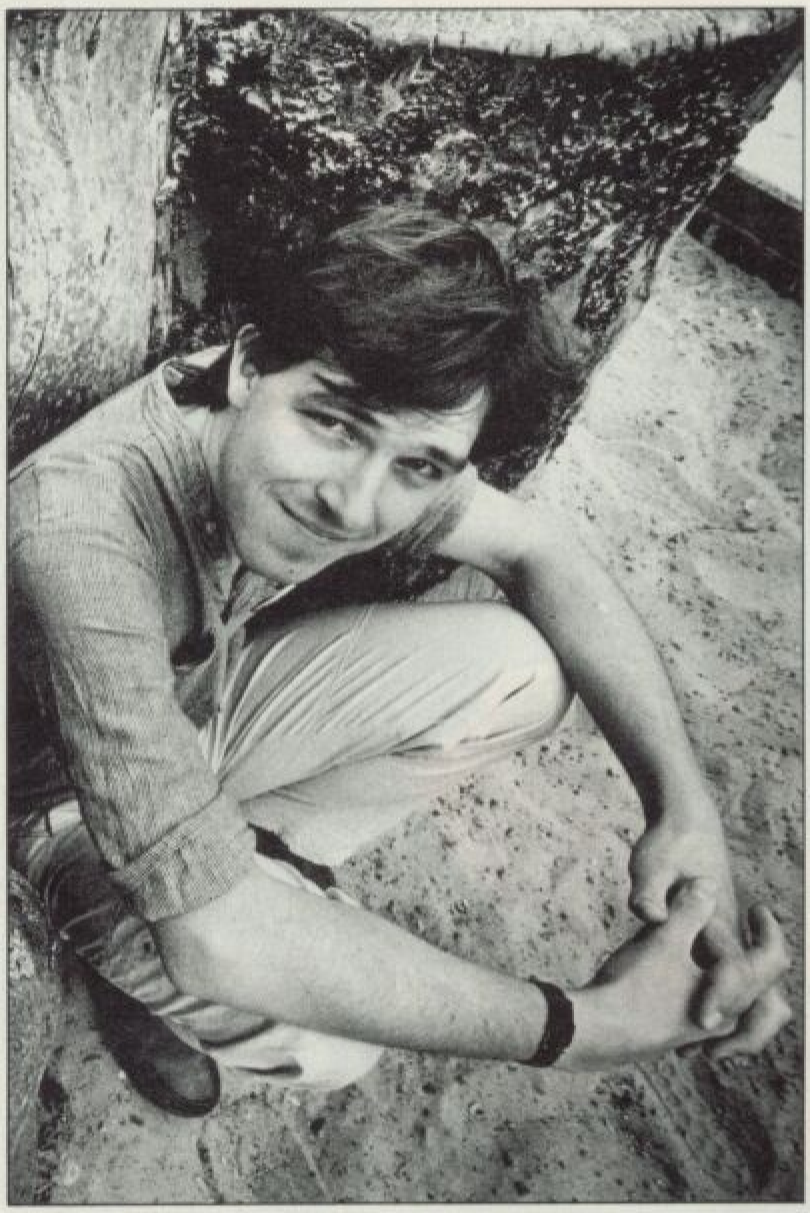
An emerging trend is one we've seen happen on the other side of the Atlantic. From the many small software houses producing games a few years ago, the majority have been swallowed up by just a few mega-companies. In the UK, the most recent (and most publicised) example of this has centred on Quicksilva which, from its humble beginnings in Nick Lambert's back bedroom (yes, it's all true folks), has now become a division of Argus Press Software, which itself is a small cog in the wheel of BET — a major British company.

Tracking down Quicksilva's Mark Eyles at a recent micro show, the obvious question was asked... "So, what's it like working for someone else?"

"What do you mean", came the horrified reply, "they work for us! But seriously, BET will give us the opportunity to develop the ideas *we* have for the company — we're still very young. We'll be moving offices over the next few weeks, and one of first projects will be to set up the Creative Design Studio, which will be spearheading our approach to the entertainment industry. We've got to come to terms with new technologies — such as the high street video disk arcade machines — and that means we're going to need the financial backing."

That sounded fine for the future, but how did he view the Spectrum's chances of surviving 1985? "Of the 70 or so programmers we have working for us, nearly a third are writing on the Spectrum — good grief, we're even still selling an amazing number of ZX81 games! I think it's safe to say that the Spectrum will be *well* supported for a long time.

"The most important thing is to come up with good original concepts for games ... and that's where I come in. You know, a lot of great programmers can work



EYLES RIGHT!

wonders with the Spectrum, but they're always asking 'But what shall I do?'. And that's not an easy question — especially with the amount of competition that's around nowadays.

"Over the next year or so, you'll be seeing a lot of cartoon characterisations in games — characters that have been made famous through books and films, like *The Snowman* in fact. We've got a quite a few things in the wings at the moment, but there's still some pretty fierce negotiating to be done yet."

Switching into a nostalgic mode, Mark was persuaded to tell the story of Quicksilva (not the one in the *Game Lords* fan mag, but the real one). "It all started with Nick's version of *Defender* for the ZX80 and his home-made RAM Pack. I helped him out when I could — after spending part of my working life teaching 'O' level Maths and biding my time in the unemployment queues, even soldering up PCBs can be interesting. It was all very friendly, with John Hollis and Caroline Hayon — old buddies — pitching in and eventually joining up full-time. Then Rod Cousens, an accounting friend-of-a-friend, was next up to form the nucleus of Quicksilva as it was. Oh, can I mention Susan Clifton — she's wonderful. (*Sorry, there isn't room. Ed.*)

"The old days may sound romantic, but they weren't at all. By ten o'clock in the morning I'd have a headache and for a year, the only thing that kept me going was black coffee and paracetamol.

"You know we were the first company to have coloured cassette sleeves and stories to go with each game. I remember getting back the proofs of the first covers and thinking 'Hey, what can we do with all this white space?'. So, I sat down there and then and wrote a story to go with each of the games. Now everyone's doing it."

So how does he see the business of selling software?

"I suppose I see our business as selling fantasies — an escape from the real-life deals. I don't see people playing games on micros as being a waste of time — it throws life into sharp relief."

Having got the philosophical bit firmly between his teeth, Mark's next comments were somewhat surprising.

"Actually, this all fits in with my personal theory of the universe (*What! Ed.*) — I believe there are separate universes inside each of us. Within each of our minds, there are parts of the imagination where anything's possible — and it's possible to tap into this collective consciousness. My aim, as a software creator, is to create fantasies that so many people believe in that it all becomes real — you've only got to look at *Lord of the Rings*, *Superman* and *Peter Pan* to understand what I mean. Anyone can produce the same ol' stuff — space adventures, *Pacman* rip-offs and the like — but if you don't believe in it...

Having covered history and philosophy, it was time to get down to earth and the nitty-gritty of what Quicksilva is intending to do now. With Christmas looming, what are the company's immediate plans?

"Over the next few weeks, QS will be releasing a couple of games for the Spectrum — *Battlezone* (like the arcade game) and *Games '84* (an Olympics extravaganza) — but they're a little bit later than we would have liked ... that's show biz, I guess. We're really excited about the new range of games you'll see in September though, so watch out. And we've just taken delivery of 10 QLs, so you can expect major QS QL product out in the new year."

So Mark maintains that neither the image nor the ideals of the company have changed despite the takeover. The days of back bedroom production and intravenous black coffee may be gone for Mark, but whether this corporate re-birth will be a successful one still remains to be seen. YS

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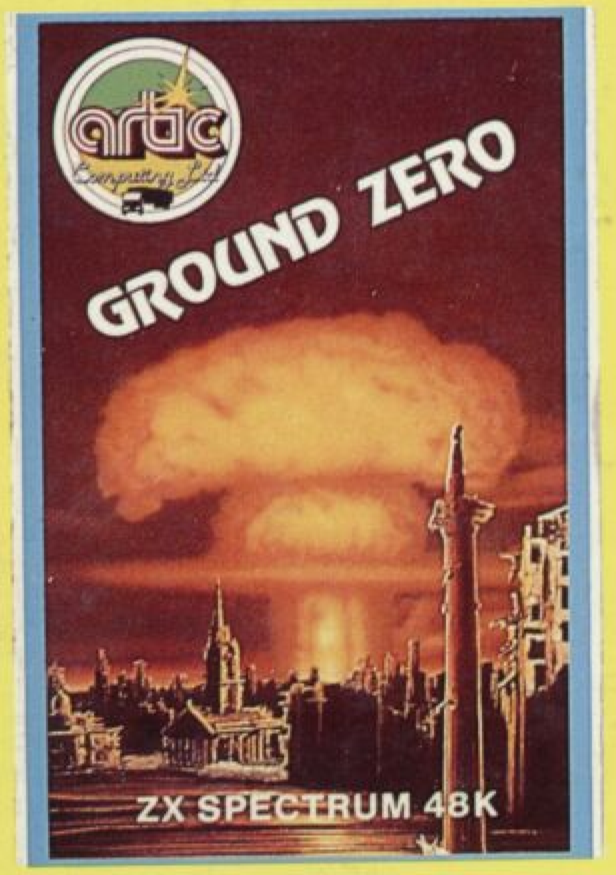
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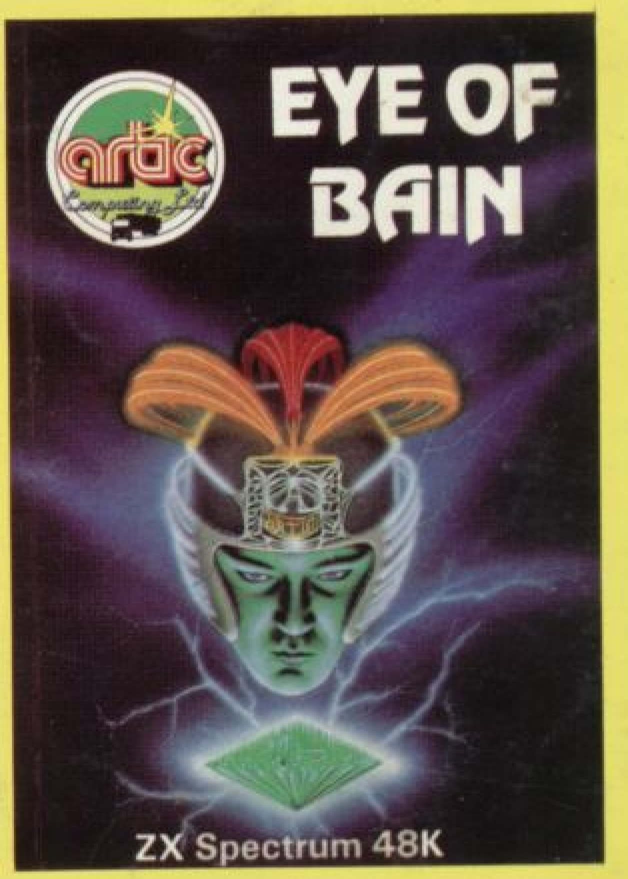
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NEW



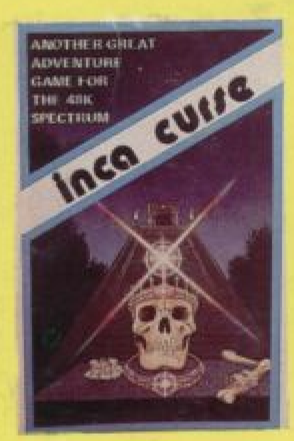
The aim of this adventure is to try and survive a nuclear attack. You do this by building a nuclear shelter or either by using the Town Hall shelter. To enable yourself to surrive, once the bomb has gone off, you also have to collect rations and at the same time try and avoid the riots. All this has to be done within a limited time period, before the bomb goes off.

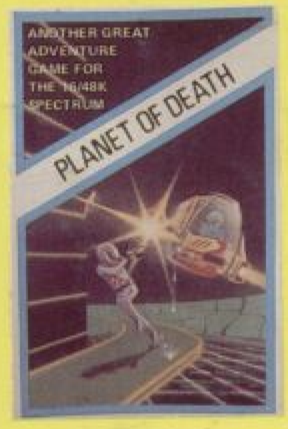
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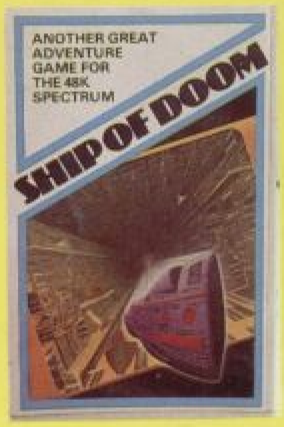


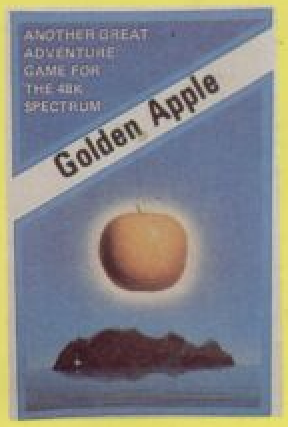
Whilst on an expedition to find a lost jewel 'The Eye of Bain', you are captured by natives and imprisoned in a grass hut. This is where the adventure really begins. Escape from the hut avoiding the villagers to find yourself possibly dying of thirst in a desert, being stung to death by bees, eaten alive by a bear and many other hideous possible endings.

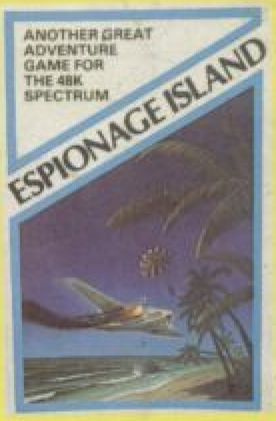
The game includes full multi-screen graphics. Cassette routines are available to save and re-load at any stage of the game.











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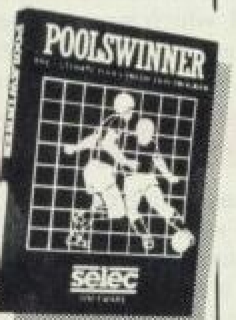
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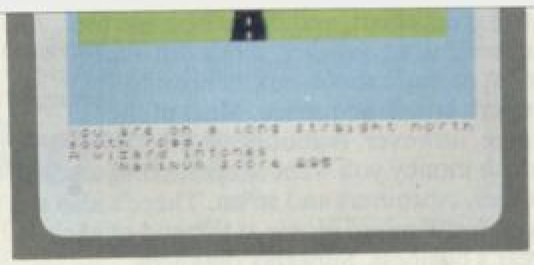
SPACE



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are to see
protect th

DUNG

This pro
machine
graphics
map. Th
facilities;
without *Dungeon Builder*.
Alex: Adventure designers are not at all original, but this one has been very highly developed and should enable adventure programs to be created that are every bit as good as the user's imagination. I, for one, will be rushing out to buy one straight away. One of the most interesting features is the way you can produce your own screen graphics, and then use any of the Spectrum's colours. **HIT**
Alan G: It's a pleasure to use, with fast *Dungeon Builder* being present. Also very good is the 100-page manual which explains clearly how to make the most of the package. **HIT**
Alan H: A utility that actually works quite well, but could have been better. It's similar to other programs like *The Quill* and *Dungeon Master*, coupled with a crude drawing program. The graphics take a good deal of time to produce, but they're pretty good when complete. Compared with other similar offerings, this one rates



favourably, but overall appeal depends upon whether you like writing adventure programs. **MISS**

LES FLICS

PSS/£5.95



The aim is to steal the Purple Puma diamond. First though, you must collect all the objects and then experiment to find out what they do, at the same time avoiding police cars, policemen and Kaolin the Chef.
Alex: Based on the *Pink Panther* movies, this is a cops-and-robbers maze game — but one which includes some well-executed graphics. The trouble is they tend to get boring after a while. This could be due, in part, to a not particularly impressive choice of colours which cause the display to appear hazy. A better choice would have made the game a lot better. **MISS**
Alan G: It's not the sort of game to keep you glued to the screen for hours, but it does make good use of the Spectrum's graphics; it's well-drawn, and moves very smoothly. However, while choice of colours is well above average, there's lots of overlapping that takes place — mainly because the characters are quite large. There's also a really good *Pink Panther* tune between lives. **HIT**
Alan H: The general idea is original, but the effect isn't. It ends up feeling like a cross between *Pacman* and an adventure — probably because the aim of the whole thing has been to give an adventure theme, while taking away a lot of the work. However, the technical execution is very good, with clear, smooth graphics, enhanced by well-chosen colours and a playing speed that's just right. **MISS**

STUART HENRY'S POP QUIZ

Bellflower Software/£5.75

Radio Luxembourg DJ, Stuart Henry, has set over 750 questions to test your knowledge of pop. The questions range from the dim and distant past to the present — so it's suitable for anyone from the oldest swinger to the youngest teeny-bopper. There's also a mystery tune to be identified.
Alex: It sounds like a pretty drab sort of program, but Bellflower has actually come up with something that can be described as good family entertainment, and not a space invader in sight — other than Boy George! The idea's very good, and there are only one or two minor problems. The first one is that the questions can't be updated and, second your answer needs to



be spelled correctly otherwise you get it wrong. **HIT**
Alan H: As you answer the questions correctly, you're given the chance to guess another note in the mystery tune (which is played at the start of a game, once only). If you guess correctly the note's displayed on the musical score, halfway down the screen. Guess them all, and the mystery's solved. The best thing about this game is that it has nothing to do with aliens, ghosts or tanks. **HIT**
Alan G: What a good idea to have a computerised pop/rock quiz for a wide range. It's appeal is only limited to contemporary music fans, which should mean that most people could get enjoyment from it. The sound is a problem and makes guessing the mystery tune difficult. **MISS**